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A Boorham & Pease Product

1971 England

1

Mar. 12 Monk's Wood
Experimental Station

Old field just east (?) of
station - about 5-6 acres.
surrounded by hedges.

Gray clay soil
~~Sparsely to~~ stand of tall
herbs and shrubs in a
continuous grass ground
layer. One of the grass species,
a fine mat-former with a
coarser erect species or two
form the ground cover.

A low arching shrub
is generally common except
in the sparsest areas.

A tall Rosa, to 2.5 m very
common. Dipsacus sylvestris
locally abundant, to 1 m tall.
A very few Quercus of petraea
about 1 m, with orange bristly leaves.

Epilobium sp. (or spp.) 1-1.5 m
abundant, also Cirsium sp.
arvense. In some parts the
grass ground cover is replaced
by a hybrid moss with
green rosettes of Daucus (?) sp.,
Cirsium sp.?, Dryopteris sp.,
plus a few other green rosettes.

Very occasional saplings of
Fraxinus sp., Quercus robur (?),
(leafless), a thorny Pyrus (?), and
perhaps other trees or shrubs. A

1971 England

dry grass to 0.8 m forms occasional tufts, and a conspicuous gregarious grass with white dry wide leaves and ~~po~~
rather close panicles forms patches, esp. in low spots.

The Rubus has non ridged canes, purple, very spiny, ~~probably~~ becoming procumbent or prostrate a few leaves persisting white beneath, purple or rarely green above.

Mammal (deer??) droppings and bird (pheasant? or chicken) droppings common.

Mar. 14 - auto trip Cambridge to Stretham and Wicken Fen

Flat land - low chalk "ridge" with reddish brown silty soil. Hedges, a few orchards, many pastures & plowed fields. In distance to north north west slightly higher ground which is Jurassic ~~of~~ green sand (glauconitic) "islands" in the low, formerly wet ground. The low ground was formerly covered by

"wires", shallow open-water ponds, now drained.

Stretham.

Stretham Wires - gray fine soil.

River Cam.

Slight elevation - a Jurassic coral reef.

Wicken

Wicken Fen - owned by National Trust.

large area of peatland covered by a mosaic of tall scrub or scrub forest of dense Rhamnus, Salix, Acer, etc. and patches of marsh or rather bog, of Phragmites and locally Cladium, 1-2 m tall. This grass is periodically harvested for thatch.

Scattered in the scrub are occasional Betula alba showing a tremendous range of habit - upright almost pustigiate branching to pendulous. Very occasional Fraxinus.

Water table essentially at surface of peat.

Maintained thus artificially against the too effective drainage of the agricultural land round about, which has

sunken even to below sea level by decomposition of the peat.

A Dutch style windmill originally from Adventurers fen, reconstructed here by the Trust. Said to be the last remaining of the thousands of "windpump" originally used to drain the fens.

A thatched tower "hide" provided for bird watching.

The Wicken Fen group maintains and protects the fen, provides guide booklets, etc.

The scrub is cut periodically to avoid succession to oak forest.

Wicken north through Soham over somewhat higher Jurassic land. Through Qua Fen and the Hasse - black peaty soil on low ground.

Rows of large Ulmus, Populus, etc. All land cultivated.

Prickwillow

"Rottens" are old riverbeds of mineral sediments winding across the peat lands left now as slight ridges

by the subsidence of the drained peat lands. Light colored against the black peat soil. Less fertile than peat.

Ely is on a very large Jurassic "island". Peat land largely used for sugar beet and market gardening.

Ouse River channeled between levees and water level substantially higher than the peatland surface.

No hedges in peat lands. Land too valuable.

Houses ~~are~~ frequently built on "rottens", more substantial than peat on foundations. Some of the rottens have archaeological remains of a number of levels on them.

Flocks of gulls are rather frequent on plowed peatland.

Deep ditches frequent, water table well below surface.

Approaching Mildenhall we left fenland and got onto slightly higher chalk land. Church built of flints.

N.Y. airbase - Mildenhall.

Flint construction here is of angular fragments rather than of nodules, ~~was~~ much more crowded.

Mildenhall - very irregular knobby surface, stabilized dunes of glacial sand.

East of Mildenhall extensive planted pine forest and some mixed hardwood, largely birch. Road lined by pines. Gorse along road and in hedge and forest edge. Patches of pines.

Rolling heathland and west *Cteridium* stands. All of this - pine, heath, bracken, on glacial sands on top of chalk. Planted pine stands perhaps 20-25 cm dbh 10-15 m tall, very small oaks, 1-2 m, with persistent orange dead leaves common under pines. Patches and edges of birch.

Wangford Warren (Clifffolk Naturalists' Trust).

Rolling area of partially stabilized, partly active dunes, tending to be grass or carex covered, patches of birch, mostly weeping, a few scattered very small pines and oaks, hawthorn.

Large areas principally stabilized by mosses & *Cladonia*.

Much dense carex sod. plants 20-25 cm tall.

Total relief perhaps 8-10 m.

Brandon - much flint construction. Pine forest & Birch forest, planted. Grimes Graves road.

heathland.

Dense pine plantation. tree to 30 cm. dbh 20 m tall.

Large open area - Grimes Graves chalk slope covered by 50 cm² of aeolian sand, the grooves in the chalk surface, normal to slope strike, are reflected in stripes of *Calluna*.

"Graves" themselves an area of dimpled terrain, appearing like sink-holes, but excavation shows they are vase-shaped holes with horizontal shafts radiating, following flint nodule layers in chalk - pits 20 m deep. ancient flint quarries. Spread over top of low rise.

Calluna stripes are of order of 3 m wide, grass stripes 4 m². Chalk is 1 m or more below the *Calluna*, 15 cm² below the grass.

Iphetford - large area of pine forest on sand on chalk.

~~From the field~~

West Suffolk limit
some lots of heather.
mostly open pasture
with rows of trees, gorse.
Heather, but open.

Then RAF Honington $\frac{1}{2}$ mi. N of Barnham
a large fenced area
basically a dense short
grass matrix with
areas of fairly dense
heath 0.5-1 m tall with
small openings with deep
moss, slopes with
somewhat irregular
heath stripes, upper
part of very wide
knoll with scattered
Ulex clump, $1\frac{1}{2}$ m tall
large spreading oaks
50-700 m apart. scattered
over the whole clumps
of Cytisus 1-2.5 m tall.
grass said to be recent
clearing, but it seems
the gorse must be at
least several years old.
Flints abundant.
Much more in grass.
Grass to west on
gentle slope with
no shrubs at all.
Calluna stripes on
very gentle slopes.
A few sheep.

West of this near Newmarket
road, Elvenden, rather
old mixed woods, patches
with large and small fields
and patches of pine plantings.

A trimmed pine hedge along
Newmarket-London road south
of Elvenden, for several
miles on one or both sides
of road. Guinness property.
Large heath area.

Fields separated by tree
hedges, mostly pines.
about 12 mi. ~~NE~~ of Newmarket.

3 mi ~~SE~~ Wieldenhall.
Same general landscape
mosaic, at first more
fields, then predominantly
forest plantings.

at road intersection near
Barton Mills.

Now mostly fields with
hedges, small patches of wood.
Light gray-brown soil on fine
chalk with only small flints.
Chalk quarries.

Cows and patches of conifers,
some birch. *Hedera canariensis*
climbing roadside trees.

Then, large fields, few
hedges, some patches of wood.
gently rolling land. Few
hedges because of race-horse
breeding and riding, large pastures.

10

1978 England

north east Newmarket.
 strips of deciduous trees.
 Newmarket large houses
 in large lots.

West to Cambridge
 strips of trees between
 fields and along roads.
 some hedges.

Large fields.
 soil reddish brown; then
 light gray, all on chalk.
 Hedges trimmed very low.

Mar. 14 - Wangford Warren,
 Norfolk

on semi-stabilized
 sand dunes

- 53636 Cladonia
- 37 Cladonia
- 38 Cladonia
- 39 Cladonia
- 40 Cladonia
- 41 (moss)

for all of above - contributing
 to stabilizing of

~~Mar. 14 1/2 mi n of Barnham~~
 Mar. 14 near Grimes Graves,
 Norfolk

in "Calluna stripes" on
 gently sloping chalk covered
 with sand

- 42 (moss)
- common

Norfolk

11

Santa Catalina I

H T

Pterulla niveoalba (Lehm. & Lindb.) Lindb.

England

53641

Polytrichum piliferum Hedw.

53642

Plenrozium schreberi (Brid.) Mitt.

53644 a

"

"

53645 a

"

"

+ *Hypnum cupressiforme* Hedw.

10

1978 England

north of Newmarket.
 strips of deciduous trees.
 Newmarket. large houses
 in large lots.

west to Cambridge
 strips of trees between
 fields and along roads.
 some hedges.
 large fields.
 soil reddish brown, then
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Mar. 14 - Wangford Warren,
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- 0 37 Cladonia
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- 0 40 Cladonia
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for all of above - contributing
 to stabilizing of

Mar. 14 to near Barnham
 Mar. 14 near Grimes Graves,
 Norfolk

in "Calluna stripes" on
 gently sloping chalk covered
 with sand

- 0 42 (moss)

common

Norfolk

11

12 1971 England

53643 *Calluna vulgaris*
dominant

Mar. 10 - 1/2 mi. n.w. of Barnham,
Suffolk
in small open spots in
Calluna heath.

① 44 (mm)
② 45 (mm)

Ralphs Suffolk

dwarf shrub 30-40 cm tall.

13

forming deep loose cushions
forming deep loose cushions

14

1971 Virginia

May 21 Roland Bull Run Mt.

Granite cliffs

Evergreens abundant
on cliffs, scarcely any
away from them -*Pinus strobus**Pinus virginiana**Kalmia latifolia*

Plants with photosynthetic stems

*Sonneratia alba**Vaccinium myrtillus*

dm

Fauquier Co.

15

16

1971 Virginia

March 28 - Roland
 2 seepy areas where
 springs issue from
 base of mts. and
 very small streams
 come down off lower slopes,
 one on each side of Roland
 Center. 1 m on a large
Vaccinium 2.5 m near
 the other a smaller bush.
 In bud but no flowers opening.
 In each a small clump
 of *Lycopodium lucidulum*
 and in each a small
 stand of *Chrysosplenium*,
 this in areas just below
 springs, absent from
 wet place fed by streamlets

Mar. 28 - north branch
 of Broad Run, 2 miles
 west of Thoroughfare Gap
 bottom land woods
 on clay flats

53443 *Ulmus americana*
⁸ occasional

8 44 *Ulmus*

Mar 28 - Roland Center, west
 base Bull Run Mts, 2 mi n.w. of
 Thoroughfare Gap

✓ 45 *Chrysosplenium americanum*
 very local in wet place fed
 by springs.

Fauquier Co.

17

north branch Broad Run
 bottom land forest
 locally swampy.
 American elm occasional,
 elm with corky bark
 rare. both in flower.
 Red maple in full flower.
 2 wood-ducks in stream.

tree 12 m tall, bark flaky,
 without corky ridges; anthers deep purple
 spreading tree 6 m tall, bark
 with corky ridges; anthers maroon.

prostrate, flowers green.

1971 Va. to Calif. (Hawaii trip)

lutter
DC-8
right side.

Mar. 31 - left Dulles airport
for San Francisco 9:15 a.m.
crossed Blue Ridge at 9:23.

Bull Run Mts., Blue Ridge,
Massawippi, Alleghenies -
Hardwood forest brown,
Evergreens ~~are~~ mostly on the
west, northwest and southwest
slopes. This pattern becomes
less pronounced in Alleghenies,
where, indeed, evergreens
become somewhat less common,
especially in the western
ridges. Locally still common
but general aspect is brown.

West of ~~the~~ the last
main continuous ridge
is an area of rather irregular
mountainous country with
broken ridges, some snow
here. A few large coniferous
patches here, especially in the
snowy uplands. No particular
pattern. Still slight emphasis
on conifers on west slopes in
draws.

One last rather continuous
range, with a river cutting
through it westward, then
turning north. Somewhat
billy piedmont country. Another
small crooked river running
n.s.

This complicated billy country

9:51

extends far to the west, to
the Ohio River, running
south and curving west.
looping north, back
south - crossed it over a
large town where there is a
major affluent from the east.

Country west of river less
billy but still not level -
about half wooded - less
so a bit to north.

9:58 A mega-meander pattern
outlined by a broad belt of
almost completely cleared
land with only a small
meandering stream in it -
joining a similar but
much more marked
north-south belt of completely
cleared intensively farmed
light colored land with a
somewhat meandering large
river, this belt very flat in
otherwise billy mostly wooded
country. West of it wooded
hills with ^{dear} valley bottoms
forming a striking dendritic
pattern, main stream
running northeast.

West of this the hills rapidly
diminish and the proportion of
cleared land correspondingly
increases.

10:03 almost completely cleared from here on.

10:05 crossed Ohio River again now flowing slightly northwest then west, then swinging northwest. Country rather hilly on both sides, esp. the Kentucky side, somewhat wooded.

10:08 A higher wooded clump of mts., Ohio River goes more westerly, for some distance, then more westerly. Northern Kentucky is very complicated - hilly. River comes south again

10:12 then westward. Similar hilly country on both sides, about 50% wooded, less so westward. Follow river slightly meandering westward. Not much bottom land along most of it, except on inner sides of curves.

10:16 crossed river (Ohio R.). Land much more checkerboard pattern, 75% cleared.

Level country, rivers trending south south west. Considerable woods along river and in several patches of hills, also trending same direction.

10:21 Fair-sized braided river, very closely meandering, through a clear valley.

Then an area of patches of wooded hills just to north with a large reservoir in west

10:25
10:26

10:22

10:31

10:36

10:39

part (Knobs Country?)
60%+ wooded, low hilly country. Large reservoir and south of it an extremely complex maze of roads - elongate buildings along many of them - military establishment?

Small river with extremely complex meander pattern with many ox bows scattered over a broad level plain, all cleared. From here on mostly cleared except for a few tiny woodlots.

Prob. Wabash R. Mostly agricultural land west of it, but appearing somewhat scabby and eroded. Drainage trending s.s.e. To a generally e.-w. stream with many oxbows, swinging n.w. and n.-n.w.

Meander and ox bow patterns very visible at this season.

Rather regular agricultural checkerboard except for s.w. trending valleys that are partly wooded. Visibility gradually deteriorating in a grayish haze or thin cloud layer.

Major s.w. ne highway. Agricultural pattern continues with some wooded land irregularly left along valley bottoms.

10:43 Bush wooded valley become numerous, running sw. toward Mississippi north of St. Louis.

10:57 Crossed Mississippi flowing almost eastward below confluence of Missouri, which forms a complex delta of wooded bare and elongate ponds and channels.

11:07 Both rivers run parallel n.s. Missouri has some wooded bottom land. Westward quite a bit of wooded country meets with agricultural land. Dendritic patterns. Visibility gone.

11:30 Base of Rockies - Pikes Peak
Mts. here very largely not wooded, a patchily so with open to dense conifer stands. Little snow. Large bare interior valleys before massive high snow-covered ranges reached. The valleys between the higher ranges much more wooded and lack the bare rocky areas farther east. Farther west there are again large bare valleys.

11:07 A large river winding through a new desert, in a gorge. This area is about the most extensive desert roadless area I have seen. Much cut by gorges - probably the same Captain said it was (or includes) Arches Nat. Monument. Westward spectacular erosion in red rocks. Rough country with large accumulations of snow in valleys and depressions, these often speckled, as though just the tops of trees were showing. Higher ridges and peaks with little snow. Large dry lake, almost white, in middle distance to north. Then vast desert area with a few roads but little disturbance, scattered range of low mountains with open forest or scrub. Much higher snow-covered ranges ahead. Many other dry lakes westward a cluster of black-rimmed pools in a dry lake. In hills foothills north of Altamont Pass a localized display of a deep yellow flower from air like spilled chrome yellow paint.

11:37 2
12:31

24

1971 California

south of Altamont Pass
on San Joaquin side, the
north slopes of lateral ridge
have sparse trees or large
shrubs and are grassy;
moderate slopes; south
slopes are treeless, rocky
and eroded-looking.

25

Apt. 7 Lawai Valley -
Pacific Tropical Botanic
Garden

A series of ravines
cut in sloping sugar
cane land, ^{red} volcanic
soil on flow basalt,
wooded with secondary
thickets of

Psidium guajava

Eugenia cuminii

Hibiscus tiliaceus

Schinus terebinthifolius

Lecocarpus leucocephala

Casuarina equisetifolia

Pithecellobium dulce

Terminalia catappa

Thevetia peruviana

Samanea saman

Cassia surattensis

Melia azederach

vines.

Passiflora edulis

Passiflora sp.

Ipomoea indica

Annona cathartica

Cardiospermum halicacabum

Dityrogramma triangularis

Portulaca oleracea

Cornus

Ipomoea carnea

L.

Oxalis *forbesii* *foetida*

Cuphea carthagenensis

herbs & suffrutescent herbs:
Nephrolepis

Nephrolepis multifida

Phyllanthus urinaria

Stachytarpheta urticifolia

Stachytarpheta dichotoma

Emilia javanica

Polypodium scolopendria

Lida acuta

Plantago major

Centella asiatica

Commelina diffusa

Cois lacryma-jobi

Amaranthus spinosus

Triumfetta semitriloba

~~San~~ *Paspalum* *Oryzopsis*

Paspalum fimbriatum

Malachrym

Cassia occidentalis

Cyperus rotundus

Abutilon

Mimosa pudica

Cynodon dactylon

Glechoma hederacea

Gomphocarpus physocarpus

Vernonia cinerea

Digitaria ~~perennans~~ *ciliaris*

Elephantopus mollis

Oxalis

Rivina humilis

Sorghum *oleraceum*

Chloris barbata

Calandrinia

Bidens pilosa

28

1971 Hawaiian Is

April 2 Lawai Valley (Pacific
Tropical Botanic Garden)
open sloping volcanic soil

150m

53646 ③ 46 *Nephrolepis multiflora* (Roth.) Jord.
common on road cut

② 47 *Phyllanthus debilis*
~~various~~
common in roadside ditch

April 2 - [Pipps Beach
grounds of Liberator, Kauai, Ht.]

③ 48 *Ruppia maritima* var. *pacifica* A. J. St. John
abundant, rooted, in
small probably artificial
pond, not conspicuously bedded,
at least in rainy period

④ 49 *Wedelia trilobata*
planted as bedding plant

April 3 - Lawai Valley above
Pacific Tropical Botanic Garden

200m

⑤ 50 *Rubus moluccanus*
very local in pasture

April 3 - Lawai Valley
(Pacific Tropical Botanic Garden)

above Pump

⑥ 51 *Digitaria*
very local in ravine near water

100m

decumbent, spreading, rooting
at nodes
(to page 32)

Kauai

29

April 2 - Kauai far -
Allerton garden
Very maintained jungle
with great range of
introduced trees, shrubs,
vines, herbs

April 2 - Poipu Beach,
(Sheraton Kauai hotel)
flora of basalt rock
strand with storm
beaches much vegetated
Ludrea indica
Pomoea peruviana sp. brasiliensis
Lescurium portulacoides
Sporobolus virginicus
Theespesia populnea
Fragaria taccada
Pomoea indica
Sevucaea leuccephala
Bonchus oleraceus
Casmirina equisetifolia
Jacquemontia sandwicensis
Eragrostis tenella
Euphorbia glomerifera
Solanum nigrum
Euphorbia hirta
Tournefortia argentea
Sida fallax

These on a 60 m stretch
of rock strand, without
penetrating back into
low scrub vegetation
or storm beach farther
than could be seen from
edge.

32

Aug 1971 Hawaiian Is.

(from M. 22-22)

~~5769 Malachia~~

[same - Big Valley] 120 m

53652 Malachia
⑥ local patch in moist valley bottom

④ 53 *Thevetia peruviana* (L.) Pers. abundantly naturalized in valley bottom and lower slopes

[same - below administration area]

① 54 in weedy roadside
 Stachytapheta dichotoma common

① 55 *Phyllanthus* ^{detub} *resedoides*. erect

④ 56 *Passiflora* climbing in tall thicket

Apr. 4 - 1.8 mi. s.w. of Polihale State Park
west side of Island]

on sand dunes just back of beach

① 57 *Ipomoea* sp. ^t *Ipomoea stolonifera* very locally abundant in swales between dunes

③ 58 *Carrichtera filiformis* locally abundant blasketing small trees

Kauai

33

sparsely branched suffrut - except herb 3 m tall, flowers bright yellow.

lactiferous shrub 3 m tall, flowers bright yellow.

herb up to 1.6 m tall, flowers medium blue (with *S. umbellifolia* but no intermediates seen)

extensive vine, bracts whitish green, petals and sepals with dark red spots, outer corona pinkish red inner corona blue violet

prostrate stems buried leaf blades flat on sand, corolla white, closed at 4 pm stems green to orange, green where partly shaded; flowers white. (to b. 36)

April 4. Polihale State Park

Sand dunes covered by
half-dead *Prosopis*, open
areas with *Verbascum*
encloroides, *Portulaca*
cyanosperma, extensive
mats of *Vitis rotunda*,
Candollea ciliata, *Solanum*
verticillata, *Solanum virginianum*,
Solanum lyngbergii,
Sporobolus virginicus,
Scorpiola maculata,
(?) *Digitaria* sp., *Berberis*,
Pennisetum macrocephala,
Chenopodium murale,
Waltlaria radicans, *Croton*
javanicus, *Lindernia fallax*,
Dodonaea viscosa, *bonduc*,
Olneya

1.3 mi w of Polihale
Iponmea stolonifera
~~Hippocratea~~
Carex filiformis

April 4 - [Polihale State Park
west side of island]
on sand dunes just back
of beach

(53659) ⑧ 53659 *Portulaca oleracea* L.
very common in openings

⑨ 60 *Sida fallax* Walp.
common in openings and
dwarf scrub

⑩ 61 *Boerhaavia diffusa* L.
common in openings

⑪ 62 *Holarrhena hypoleuca* L.
common very locally in openings

⑫ 63 *Vitis rotunda*
very common on seaward
part of dunes

April 5 - Lihue

planted or spontaneous
in roadside clumps of forest,

⑬ 64 *Macaranga* ♀
⑭ 65 *Macaranga* ♂
⑮ 66 *Macaranga* (young)

prostrate, fleshy, roots
thickened, corolla deep
magenta purple, closed
at 5:30-6:00 P.M.
depressed shrub, corolla
as broadly campanulate,
somewhat reddish in center.
creeping stems radiating
from thickened root,
elongate; leaves whitish
beneath flowers white
(all plants seen had white flowers)
aromatic, flowers yellow,
fruit green.
as woody stems prostrate,
forming very large mats,
flowering branches erect,
corolla bluish purple.

trees to 10m tall.

38

1971 Hawaiian Is.

April 7 - Honolulu, Palama,
near Palama Elementary School
5766a *Hedrella quebecensis*
abundant along fences
and in lawns

Oahu

39

prostrate to ascending,
flowers yellow.

Maui

April 9 - Haleakala Road,
west slope of Haleakala

① 67 *Vaccinium reticulatum* L.
very common in open scrub

② 68 *Vaccinium reticulatum* L.
very common in rather
dense scrub.

6700'

2000'

2440m

leaves slightly dull glaucous.
shrub 0.6-0.8 m tall, flowers
pendent, red with pale
green lobes. (4 plants reported)

— shrub 0.8 m tall, leaves
slightly dull glaucous.
flowers pendent, reddish to
greenish red (or some blue), lobes
pale green, ripe fruit dark
red. (all specimens from same bush)

April 10 - Haleakala Road 6500':
Lepechinia locality -
 the road widening did not
 eliminate the *Lepechinia*
 plants - & are still present
 on the top of the road cut.
 Another substantial
 clump is on an east slope
 30-50 m. in from the road
 full flower.

Open scrub, *Syzygium*
 dominant, *Vaccinium*
 common, a few *Sophora*
 bushes, *Pteridium*, *Coprosma*
ernodeoides, *Polyphodium*
pellucens, *Asplenium*
adiantum-nigrum, *Lellaea*
ternifolia (r), *Anthoxanthum*,
Holcus, etc. *Typhochlaena radicans*

Small gulch - walls have
Sophora in some abundance,
 a few *Coprosma montana*,
 a few *Dodonaea*, shrubby *Dubautia*,
 considerable *Impatiens adenophora*
 very badly galled but still
 flowering. A few small
Santalum.

Crater Rim, Haleakala
 Many or most of the
Dubautia shrubs in the
 main visitor center area
 are dead or almost so.

April 11 - visited Colin Lennox
 place, Kula, 4000'
 several very healthy
Lepechinia plants in his
 garden, very vigorously
 flowering. Not a bad
 ornamental - reddish mauve
 flowers. Seeds from 6500' on
 slope above - see 640.

Many handsome Proteaceae
 flowering - *Protea*, *Leucospermum*,
Leucadendron, etc. Also some
 interesting Myrtaceae from
 Australia.

April 12 - flight Kahului-Hilo 95 min

Forest on slopes of Haleakala bet Haiku and Hana seem generally in poor condition - patches of Gleichenia are abundant.

Gulches below Haiku in some areas have strings of Alocasia. Would be worth looking into.

Much snow on Mauna Kea, down to probably 10,000', some also on Mauna Loa but not down as far.

Along Hamakua coast w of Hilo much floating bagasse out a mile or so. Much silt at mouth of one large canyon about half way bet Lanipahoehoe and Hilo. Many bare fields since. Waterfalls conspicuous along this section, pouring into ocean. Quite a bit of bagasse close in, toward Hilo.

Volcano Road

Just below 3000', Tritonia very orange - apparent effect of SO₂.

Kilauea Iki Overlook

Lycopodium cernuum in not unhealthy condition, though slightly yellowish.

Just before Puhiwai in chain of craters road in depression with many old dead Lehua trees; almost all small Lehua killed by frost in ~~Feb~~^{Dec} 1969

Hilina Pali road, at burned area Kipuka Nene Kobia and Alphitonia planted in edge of kipukas of very large Metrosideros - both fruiting.

In burned area Setaria geniculata? Physalis peruviana, Achlaena Agrostis arenacea, Stachys tarjatica dichotoma, Plantago lanceolata (roadside), ~~Ents.~~ abundant Salvia coccinea, Bidens pilosa less common.

April 17 Puhimau notes

Leaves no 4 dead ^{leaves}
no 5 dead

dead leaves still on
no 3 ~~etc~~ (toward crater
from 4, 2 m from crater)

dead, no leaves but
small twigs still on)

no. 5 - living
many twigs dead
esp lower ones but
living growth very
leafy, dark green
healthy looking
upper part very few
dead twigs

no 8? (pieces of tag
on ground but
lacking number)
tree about in
condition of no 5.

No 7 healthy with
a few dead twigs all
the way up and
leading shoot has
some flowering

Anemone pafornea occasional
around Puhimau

Pages

Lawai Kai, Allerton Garden, Poipu Beach, (Sheraton Kauai Hotel) ... (Description) ..	30-31
Polihale State Park ... (description) ...	34
Polihale State Park west side of island, Lihue, Honolulu, Palama, Haleakala	
..... 53659-53668	36-39
Haleakala Road, Crater Rim, flight	
Kahului-Hilo, slopes of Haleakala bet.	
Haiku & Hana, Mauna Kea, along Hamakua	
Coast w of Hilo, Volcano Rd, Kilauea Iki	
Overlook, Puhimau on Chain of Craters road,	
Hilina Pali road, at burned area Kipuku Nene,	
Puhimau Crater, Kipuka Puaulu . (description)	40-47
Kilauea Iki Overlook, Puhimao Crater,	
Chain of Craters Rd, Kipuka Nene, Hilina	
Pali Rd, Kipuka Puaulu, Kipuka Ki, Mauna	
Loa Strip Rd 53669-53691	48-53
Mauna Loa Strip Road, Kipuka Ki, old	
Pahoehoe slope, Lookout, Kipuka Ki & K. Puaulu	
Puhimao Hot Spot (description) ...	54-57
Mauna Loa Strip Road, Lookout, Acacia koa	
forest, Road to Bird Park from Kilauea,	
Puhimao Crater, Chain of Craters Rd,	
Kalapana Beach 53692-53709	58-61
Road to Kalapana from Olaa, Kamaile Flow,	
Kalapana Beach (description)	62-65
	68

heavy vegetation
scattered dead twigs
many epiphytic twigs

Collection & Field Note Book

No. 95

Mar. 12, 1971 - Dec. 24, 1971

(53636 - 53926)

	<u>Pages</u>		<u>Pages</u>
<u>England</u>			
Monk's Wood Experimental Sta, auto trip Cambridge to Stretham & Wicken Fen, Wicken north through Soham, N.S. Airbase -Mildenhall, Wangford Warren, Grimes Graves, West Suffolk, Barnham, near Newmarket road, Elvenden, northeast of Newmarket Strips, west of Cambridge Strips (description)	2-10	Lawai Kai, Allerton Garden, Poipu Beach, (Sheraton Kauai Hotel) ... (Description) ..	30-31
Wangford Warren, Grimes Graves, Norfolk Barnham, Suffolk 53636-53645	10-13	Polihale State Park ... (description) ...	34
<u>Virginia</u>		Polihale State Park west side of island, Lihue, Honolulu, Palama, Haleakala 53659-53668	36-39
Roland, Bull Run Mts, Fauquier Co. (description)	14-17	Haleakala Road, Crater Rim, flight Kahului-Hilo, slopes of Haleakala bet.	
North br. of Broad Run, west of Thorough- fare Gap, Roland Ctr., w. base Bull Run Mts. 53643-53645	16-17	Haiku & Hana, Mauna Kea, along Hamakua Coast w of Hilo, Volcano Rd, Kilauea Iki Overlook, Puhimau on Chain of Craters road, Hilina Pali road, at burned area Kipuku Nene, Puhimau Crater, Kipuka Puaula . (description)	40-47
Va. to Calif. (Hawaii trip) Bull Run Mts., Blue Ridge, Kentucky-Ohio-Indiana-Illinois, California, South of Altamont Pass, on San Joaquin side (description)	18-24	Kilauea Iki Overlook, Puhimao Crater, Chain of Craters Rd, Kipuka Nene, Hilina Pali Rd, Kipuka Puaulu, Kipuka Ki, Mauna Loa Strip Rd 53669-53691	48-53
<u>Hawaii</u>		Mauna Loa Strip Road, Kipuka Ki, old Pahoehoe slope, Lookout, Kipuka Ki & K. Puaulu Puhimao Hot Spot (description) ...	54-57
Lawai Valley, Pacific Tropical Botanic Garden (description)	26-27	Mauna Loa Strip Road, Lookout, Acacia koa forest, Road to Bird Park from Kilauea, Puhimao Crater, Chain of Craters Rd,	
Lawai Valley (Pacific Tropical Botanic Garden, Poipu Beach, grounds of Sheraton Kauai Hotel, Big Valley, Polihale State Park 53646-53658	28-29	Kalapana Beach 53692-53709	58-61
	52-53	Road to Kalapana from Olaa, Kamaile Flow, Kalapana Beach (description)	62-65
			6 68

W. & V. new tag
healthy tree ^{done} with a few
scattered dead twigs
many epizone twigs.

Collection & Field Note Book

No. 95 (Cont'd)

Mar. 12, 1971 - Dec. 24, 1971

(53636 - 53926)

	<u>Pages</u>		<u>Pages</u>
Kalapana, Kilauea Rd, below Naulu Forest, Kamaile Flow near Pahoa .. 53710-53716	66-67	Australia	
<u>Virginia</u>		trip from Canberra-- Bungandore, Manar Creek n.w. of Braidwood, e. of Bungandore Warri Bridge, Shoalhaven Rd, Endrick River, Pigeon House Range, Tianjana Falls, Milton, Yaccunigarrah Cr., Kialoa State Forest, Cockwhy Cr., s.w. of Termeil, Bateman's Bay, Clyde Mt. (description)	90-95
Roland, s.w. base of Bull Run Mts., n.w. of Thoroughfare Gap, 53717-53718	70-71	Manar Cr., Durran Durra & Marlow, Warri Bridge, Shoalhaven River, Pigeon House Range, Tianjana Falls, Milton, Kialoa State Forest, Bateman's Bay, Clyde Mt., Tidbinilla	96-103
Roland Ctr., s.w. slope Bull Run Mts., 2 mi. n.w. Thoroughfare Gap, Sleepy Hollow, 1 mi. s. of Falls Church 53723-53724	78-79	Hawaii	
<u>Finland</u>		West side of Kahului Bay, Kula (description)	104-105
Trip to Finland--toured Helsinki, Saarinen Estate, trip to Jyvaskyla, Saarijarven, Pyhahakki Natural Park, Amsterdam (description)	72-77	West side of Kahului Bay, Haleakala Ranch pasture	106-107
	80-81	<u>Virginia</u>	
<u>Finland-Massachusetts</u>		Roland, Fauquier Co. 53773.....	108-109
Pyhahakki Natural Park, near Saarijarven, Jyvaskyla, Sunderland Cascades, Franklin Co., Mass. 53719-53722	78-79	Trip to Roland, Rt. 66 bet. Beltway & Gainesville (description)	112
<u>New York-Orleans Co.</u>		E.U.S.	
west of Sweden Ctr., just north of Jackson Rd (description)	82-83	Flight to St. Louis, crossing Blue Ridge, south of Front Royal .. (description) ...	110
<u>Massachusetts</u>		<u>Louisiana - British Honduras</u>	
Leverett Coke Ovens, Rattlesnake Gutter, Sunderland Cascades, Wharton Brook State Park (description)	84-85	New Orleans, Mississippi River at Audubon Park, Belize, Robertson Island, Tobacco Pass, southwest pass of Glover's Reef,	
Trip to Ceylon (description)	86		
<u>Indonesia - Java - Bali</u>			
Tjibojung, Sangeh ... (description)	88-89		

(continue)

116. 1 V new log
healthy tree dense
scattered dead twigs
many epiphytic twigs

Collection & Field Note Book

No. 95 (Cont'd)

Mar. 12, 1971 - Dec. 24, 1971

(53636 - 53926)

Pages

Southwest Cay II & I, Long Cay, Small Cay, (description)	114-123
Small Cay (Long Cay North), Long Cay 53774-53808	124-127 130-131 134-135
Glover's Reef, flight around & Across atoll, Northeast Cay (description)	128-129 132-135
Northeast Cay, Long Cay, Southwest Cay I 53809-53858	136-141 144-147
Northeast Cay, air trip to Lighthouse Reef, Southwest II Cay, Southwest Cay I (description)	142-143 148-153
Southwest Cay I, Southwest Cay II, West Channel, Long Cay 53859-53910	154-163
Boat trip to Leeward Reef, Middle Cay (description)	164-167
Middle Cay, Long Cay 53911-53926	168-171
<u>Massachusetts</u> Shutebury, Franklin Co. (description)	174-177

End/

around Barbuda

No. 12 new log
 healthy tree with a few
 scattered dead twigs
 many epiphytic twigs.

Collection & Field Note Book

No. 95

Mar. 12, 1971 - Dec. 24, 1971

(53636 - 53926)

PagesEngland

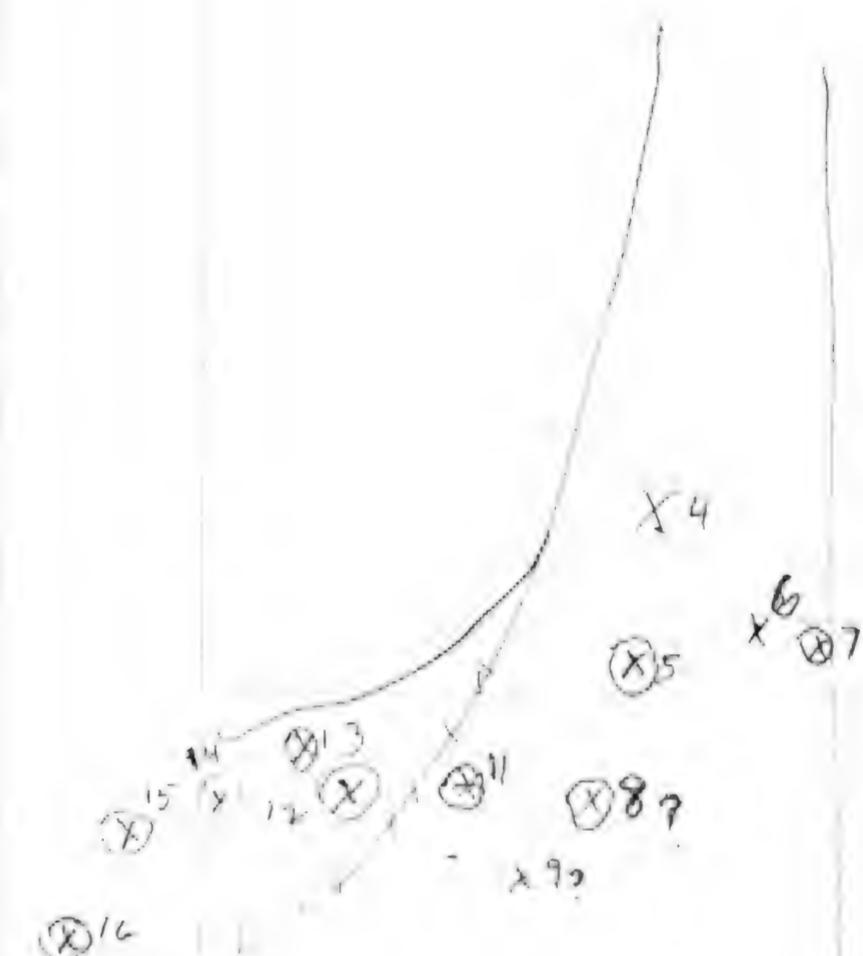
Monk's Wood Experimental Sta, auto trip
 Cambridge to Stretham & Wicken Fen,
 Wicken north through Soham, N.S. Airbase
 -Mildenhall, Wangford Warren, Grimes
 Graves, West Suffolk, Barnham, near
 Newmarket road, Elvenden, northeast of
 Newmarket Strips, west of Cambridge
 Strips (description) 2-10
 Wangford Warren, Grimes Graves, Norfolk
 Barnham, Suffolk 53636-53645 10-13

Virginia

Roland, Bull Run Mts, Fauquier Co.
 (description) 14-17
 North br. of Broad Run, west of Thorough-
 fare Gap, Roland Ctr., w. base Bull Run
 Mts. 53643-53645 16-17
 Va. to Calif. (Hawaii trip) Bull Run Mts.,
 Blue Ridge, Kentucky-Ohio-Indiana-Illinois,
 California, South of Altamont Pass, on San
 Joaquin side (description) 18-24

Hawaii

Lawai Valley, Pacific Tropical Botanic
 Garden (description) 26-27
 Lawai Valley (Pacific Tropical Botanic
 Garden, Poipu Beach, grounds of Sheraton
 Kauai Hotel, Big Valley, Polihale State
 Park 53646-53658 28-29
 32-33



April 17 Putman crater

Schinus tree no 4 dead leaves
no 6 dead
dead leaves still on
no 3 ~~off~~ (toward crater
from 4, 2 m from crater)
dead, no leaves but
small twigs still on
no 5 - living
many twigs dead
esp lower ones, but
living growth very
leafy, dark green
healthy looking.
upper part very few
dead twigs

no 8 ? (pieces of tag
on ground but
lacking number
tree about in
condition of no 5.

No 7 healthy, with
a few dead twigs all
the way up and
leading short dead
some flowering

Anemone gaeforcea occasional
around Putman



No. 11 new tag -
almost dead, with a
scattering of dull reddish
leafy twigs throughout
entbasal branch with most
twigs still alive, but very
reddish dull yellow.

No. 17 new tag ~~rose~~
healthy tree with a few
scattered dead twigs
many epiphytic twigs.

No. 13 Healthy tree
with quite a few dead
twigs throughout but
mostly back on branches
no epicormic twigs,
rather sparse

No. 14 new top
almost dead top dead
a few clumps of very red-
yellow epicormic twigs
healthy sprouts near base

No. 15 Healthy large (10 m)
tree, a few dead twigs
throughout, some healthy
basal branches, but
no epicormic shoots.

No. 16 Very leafy, but
almost dead except
for one healthy basal
branch. Branch toward
crater slightly more
healthy than rest of upper
part of tree.

Apr. 13 road to Kipukra Bravura
cow dropping on road

photo

April 13 - Kipukra Bravura

Hibiscus giffardianus in
good flower - tree now about
10-12 m tall, another at least
2/3 as high, 4 saplings, unstranded
seen *H. brasiliensis* gone

Two sides of fence back
of path striking contrast
Inside fence *Musa longipes* esp.
luxuriant, abundant
healthy seedlings -
Coprosma propinquia
No bark damage no
pig rooting

Outside almost
all *Coprosma* seedlings
dead, bark removed at
1-1.5 m. Ferns much less
luxuriant, absent in
places. Much pig
rooting

fence only a hog fence
with one wire above it

In rooted places now
seedlings are common, locally
also *Coprosma* seedlings, now
taller than 20 cm

Geranium carolinianum v. australis
abundant in relatively recent
pig rooting, common before grass

(to page 54)

48

1971 Hawaiian Island.

April 17 - Kalanea Iki Overlook

53669 ⑥ *Dubautia scabra* var. *scabra*
 common in edge of
Metrosideros forest

April 17 - Puhiwao Crater,
 Chain of Craters Road
 in open, degraded
Metrosideros forest

70 ⑦ *Vaccinium reticulatum* ssp.
 very common

② 71 fungus

~~epiphyte~~ on recently dead
Metrosideros trunks

① 72 fungus
 on dead *Metrosideros*,
 trunks dead some time

April 17 - Pipiwai path,
 Pali Lookout
 in edges of patch of
 tall *Metrosideros* trees

③ 73 *Dubautia scabra* var. *scabra*
 very common

Hawaii - Hawaii
 national park

49

3780' low sprawling shrub,
 flowers white.

3780'

dwarf
 shrub to 3-4 dm tall,
 leaves stiff, bright green,
 somewhat ~~glossy~~,
 glossy, flowers red,
 ellipsoid.

weak dwarf shrub,
 flowers white.

April 12 - Kipukoa Nene
 State Hilina Pali Road
 in edges of patches of
 tall Metrosideros trees

53674 *Kokia drymianoidea*
 small planted trees

(2) 75 *Alpinia ponderosa* Hbd.
 small probably planted tree

(2) 76 *Bromus rigidus*
 local

(2) 77 *Digitaria*
 local

(2) 78 *Setaria geniculata*
 very common in burned
 over area

April 12 - Hilina Pali Road,
 between Kipukoa nene and
 Chain-of-Craters Road.

(2) 79 *Scaevola kilaueae* Degener
 local in open metrosideros
 forest on lava flows

April 12 - Hilina Pali
 in rock crevices
 on cliff

(2) 80 *Nephrolepis multiflora* (Retz.) Jord
 occasional

(4) 81 *Sphenomeis chinensis* (L.) Max
 occasional, also on coarse
 talus

2925

890m



tree 4 m tall.

tree 4 m tall, fruit green

depressed to ascending
 culms spreading
 to ascending, so
 leaves slightly glaucous

3300'

1000m

depressed shrub,
 fruit black, fleshy, fleshy
 (seed sent to Fairchild Tropical
 Botanic Garden)

1500 m

400-685m

leaves very crinkled in
 texture.

52

1951 Hawaiian Is.

53682 *Galinago parviflora* Cav.
 ③ 83 on ledges below top of cliff
 ① 84 *Galinago parviflora* Cav.
 in deep cavities in talus
 ⑤ 84 *Galinago parviflora* Cav.
 on bank above trail, abundant
 ③ 85 *Galinago parviflora* Cav.
 on trail below top of cliffs
 ② 86 *Galinago parviflora* Cav.
 on trail part way down cliff.

Hawaii Volcanoes National Park 53

rays white
 rays white
 rays white
 rays white
 rays white
 rays white

April 13 - Kipukka Puuulu

4000'

④ 87 *Dryopteris*
 locally common

1220m

⑤ 88 *Geranium carolinianum* var *austrole*
 abundant, especially
 where pigs have been rooting

large rosette from
 erect rhizome, spreading
 spreading to strongly
 ascending.

⑦ 89 *Urena sandwicensis*
 rare

weak-stemmed, from a
 thickened root, flowers light pink
 slender tree 4-5 m tall,
 young buds only.

April 13 - lava flow just
below Kipukka Ki

4140'

⑥ 90 *Osteomeles anthyllidifolia* Lindl.
 common

1260m

procumbent mat-forming
 shrub, several on long,
 flowers white.

April 13 - Mauna Loa Strip Road above
Kipukka Ki

4200'

⑤ 91 *Stachytarpheta dichotoma* HBK.
 locally abundant in grassland

1230m

suffrutescent herb or shrub 1-2 m
 tall, flowers medium blue, stems black.

Apr 13 - meadow to right
just after start of
Mauuna Lava Bluff road.

Half dozen *Hibiscus* delphini-
folia *lau-alacrenum*, several
Pitcairnia lissimerae sp.
& *Hibiscus* *upperianum*
(fl & fr.) planted

Scattered *Vitis* vine
Sapindus. Large *Metrosideros*
in and around meadow. Several
small *Peperomia* and
Pisonia cf. *welchii*? *Sophora*.

Ground cover of *Holcus*
very dense, with *Pteridium*,
Corniculina, *Cyperus* brevifolius
Poa compressa,
locally *Geranium*, *Verbena*
littoralis, *Rubus penicillans*
Hedysarum (scarce)

Days have rooted intermixed
but very locally, esp. under
Sapindus.

1 ~ plant *Loranthus* *asper*
no *Hydrostachys* seen
A few cow droppings - fresh

Lava flow(s) below
Kipukula Ki - partly scrub-
covered, *Dodonaea*, *Styphelia*,
spars small *Metrosideros*,
occasional *Vaccinium*,
occasional *Polypodium pellucens*.

Part of this flow, or an
adjacent one, has large
Metrosideros, considerable
fairly large *Dodonaea*,
a large leafed, fairly
large *Wilestroemia* is
occasional, *Ostrolenka*
abundant, an elongate
procumbent form.
Psilotum nudum rare,
Carex wallichii abundant

6200' Old pahoehoe slope -
mosaic of patches of acacia
tree forest, *Styphelia*-*Vaccinium*
scrub and *Deschampsia australis*
bunch grass.

Most *Vaccinium* here is
V. peleianum, with bluish,
stiff leaves, dark maroon-purple
flowers, bushes to 2 m tall.

Some *V. reticulatum*, bright
green, lower stature.

Styphelia variable complex
Vaccinium peleianum

6000' Enclosure 10x 30 m
on slope, partly open *Styphelia*
scrub with *Deschampsia*
partly tree forest.
fenced in ~~400~~ July 1969

grass much thinner
outside, no tree sprouts,
abundant sprouts to 1 m
inside, thick grass.

5000' *Styphelia* scrub with
Poa
Pteridium
Vaccinium spp.
Deschampsia
Dodonaea

above this several hundred ft.
a forest of *Dodonaea*

Bet. Kipuka K and K Peahi
along roadside *Bulbostylis*
capillaris and *Arenaria* sp.

Puhimas Hot Spot

Nephrolepis multiflora (in dense ground)
Metrosideros collina (in scrub)
Psilotum nudum (in stems) ♀♂
Cyperus polyphyllus
Fimbristylis dichotoma m.
Tricholema roeca
Digitaria chinensis
Bulbostylis capillaris (dead) (dead)
Andropogon virginicus
Portulaca oleracea
Waltlaria indica
Paspalum conjugatum
Ctenis longipila
Buddleia asiatica
Euphorbia lutea (dwarfed)
Ophioglossum
Arundinella graminifolia
Lycopodium cernuum
Sphenomeris chinensis
Ageratum conyzoides
Laccopeltis indica
Vaccinium reticulatum (top of tiny rock peak)
Elaphoglossum reticulatum (concentric)
Dodonaea viscosa
Styphelia tameiana
Spathoglottis plicata
Pityrogramma calomelanos
Lindsaea ensiformis
Emilia javanica
Corryza can

Anemone japonica nearby

April 13 - Mauna Loa Strip Road,
Lookout

in scrub alternating
with koa forest on gentle slope

6650'

1035m

④ 92 *Styphelia*
common

⑩ 93 *Styphelia*
common

4 93a *Styphelia*
common

April 13 - Mauna Loa Strip Road,

in Acacia koa forest

6200'

1890m

② 94 *Parmelia*
on horizontal branches of
~~the~~ tree, common

shrub 1.5 m tall, flowers white

shrub 1.5 m tall, flowers white

shrub 1.5 m tall

② 95 *Usnea*
abundant on branches
and twigs of trees

~~—————~~

① 96 *Vaccinium peleanum* Schott.
common in scrub in openings

shrub 1.5 m tall, leaves
glaucous, flowers maroon

④ 97 *Styphelia tameiameiae*
dominant

6100'

1860m

shrub 2 m tall, flowers
white.

April 13 - Road to Bird Park
from Kilaeua

1250m

③ 98 *Vaccinium reticulatum* Lm.
common

dwarf shrub 3-4dm tall,
leaves bright green, flowers
blood red with green lobes.
tube somewhat swollen.
fronds erect.

③ 99 *Nephrolepis multiflora* (Robt.) Janett
very local in filled lava cracks

April 13 - hot spot below
Puhihue crater, Chain of Craters Road
nearly bare hot earth
with many fumaroles

53700 ① *Nephrolepis multiflora* (Robt.) Jarrett
in cracks on low stumps

② 01 *Fimbristylis dichotoma* var.
abundant on

② 02 *Sphagnum*
locally common around
mouths of fumaroles

① 03 *Pteris*
around mouth of fumarole

① 04 *Pteris*
around mouth of fumarole

① 05 *Pteris*
around mouth of fumarole

① 06 *Lindsaea ensiformis*?
very rare, mouth of fumarole

53703 ⑦ *Nephrolepis multiflora* (Robt.) Jarrett det. Jarrett, 1976 fronds erect
in local dense stands,
very common

③ 08 *Nephrolepis multiflora* (Robt.) Jarrett det. Jarrett, 1976
abundant around a fumarole
in cooler ground near edge
of open area

3600'
100 m

fronds erect
leaves curved, prostrate,
stems prostrate

April 14 Kalapana Beach, two
in freshwater pond back of
dunes

④ 09 *Egeria densa* (Brid.)
abundant

0 m

loosely rooted or floating, flowers
white, emersed

April 14 - Road to Kalapana from Olaa.

Carex obtusifolia has spread along road for some miles from Olaa (n)

Melochia umbellata also.

Several small *Carex* along road. 40-60 cm tall in patches 15-20 m from road. Larger branched one farther on and a colony at 77.0 One large one at 78.7 80. several far up side of road.

83.5 Pahoa

Photos
Original vent of 1955 flow (where old house & store were)

Rocks now light gray with a luxuriant growth of *Stereocaulon vulcani* to 3-4 cm tall.

- a *Nephrolepis multifida*
- c *Arundina graminifolia* (fl)
- c *Metrosideros collina* (5.0-5 m) (fl)
- c *Andropogon virginicum*
- o *Melastoma malabathricum* (fl)
- i *Rhacomitrium* (very sheltered spot)
- a (most) very common esp in cracks
- o *Psilotum nudum* (fl)
- i *Eupatorium riparium*
- i *Saddleria cyathoides* (sheltered)
- i *Pluchea odorata* (fl)

A number of others

species in disturbed area along rd.

Mimosa pudica

Cassia leschenaultiana

Nesmodium canescens

Lycopodium cernuum

Machaerina angustifolia

Nephrolepis indica

Hypothelia plebeja

Pityrogramma calomelanos

(spreading up slope along path)
lower end of this flow has no lichens or other plants.

At Papaya factory

quite a few seedlings (scropic)
to 1-1.5 m on road embankment

1 *Manihot glaziovii* sapling
2-3 m. unbranched.

Upper road across Kamaile Flow 1955
Photo of kipuka

Kalapana Beach

coconuts planted ~~all~~ on most of dunes. *Ipomoea pes-caprae*

Fresh water pond seaward of road has abundant *Egeria*

Photos

Place where flow cut road - lava flowed 100-200 m down road.
No noticeable effect on vegetation for more than 1 or at most 3 m from edge of flow.

near edge of flow
Lantana camara
Waltheria indica
Chrysopogon
Vernonia cinerea
Tephrosia pectoralis
Doryopteris decolor s. decolor
Cassia leschenaultiana
Tricholaena
Emilia javanica
Desmodium trifolium
Bidens pilosa
Indigofera cf. suffruticosa
 seedlings of
Waltheria

Carica

Chrysopogon?

Doryopteris and *Nephrolepis* very common
 in crevices in road-cut.

Pahoehoe lava entering
 sea in flows that spreads
 laterally along foot of low sea
 cliff, flowing onto fresh black sand
 beach. Shallow greenish water
 out about 100m.

Lava oozing out along beach
 side of flow, glowing; waves
 breaking on seaward side of flow,
 occasionally coming clear over.
 Water boiling in pockets.

photo

p = patches of ash in depression
 c = cracks (a few plants also in holes) 65

Lava flat to 100m back
 of cliff where lava is
 entering sea -

- o *Portulaca* (p)
- a *Fimbristylis cymosa* (c+p)
- c *Waltheria indica* (c+p)
- lc *Euphorbia thymifolia* (p)
- o *Pluchea odorata* (c+p)
- n *Digitaria henryi* (p)

Lava flat between road
 and 100m from edge

- c *Vernonia cinerea* (p)
- vc *Heteropogon contortus* (c+p)
- o *Pluchea odorata* mostly ~~near sea~~ near sea
- a *Nephrolepis multiflora* (c) holes
- a *Waltheria indica* (p+c)
- vi *Chrysopogon aciculatus* (p+c)
- c *Desmodium trifolium* (p)
- o *Passiflora foetida* (p)
- a ~~—~~ *Cassia leschenaultiana* (p)
- *Dactyloctenium aegyptium* (p) ~~near sea~~
- *Paspalum conjugatum* (c) ~~near sea~~
- o *Portulaca* (p) ~~near sea~~
- Doryopteris* ^(p) *Emilia javanica* (p)
- Formicaria* ^(p) *Dodonaea viscosa* (c) no plant sea
- Couyphania* ^(p) *Stypelia tameiacea* (p) one clump sea
- bonariensis* ^(p) *Tephrosia pectoralis* (c+p)
- o *Fimbristylis hawaiiensis* (p) ~~near sea~~
- o *Lantana camara* (c) away from sea
- c *Tricholaena rosea* (p+c) away from sea
- a *Bulbostylis capillaris* (p) away from sea

Apr. 14 - where 1971 flow
cut Kalapana - Kilauea Road
below Na'auao Forest
in dry low scrub near edge
of lava flow

53710 *Indigofera tinctoria*
at edge of lava (survived at
exact spot where I. suffruticosa
was killed?)

(4) 11 *Indigofera suffruticosa*
near edge of lava flow
(dead branch killed where I. tinctoria
survived)

same - ^{new} plant from
sea

(5) 12 *Potularia*
occasional in ash and cinder
pockets on pahoehoe flow

(3) 13 *Fimbristylis brawianensis*
occasional in ash pockets on
pahoehoe flow

(6) 14 *Passiflora foetida* L. var.
occasional in small depressions
in pahoehoe flow

April 14 - cone at head of Kamaili flow
¹⁹⁷¹
near Pahoa

on surface of ~~the~~ pahoehoe lava

(1) 15 *Eriogonum lanuginosum*
very rare, only 2 tufts seen in sheltered spot

(2) 16 (moss)
very common

flowers salmon or old-rose
to

shrub 1 m tall, fls salmon or
old-rose

fleshy, bronze, subterete leaves,
fringed roots, rose-pink
flowers, closed at 2 pm

rounded cushions

no capsules seen.

Lambucus mexicana
naturalized several places
along Volcano Rd. and also at
Kapoho.

Cecropia on road to Kapoho
where abiggia is.

for list
2d
P. 115

Area near ¹⁹⁷¹ lava flow
4 discernable belts of vegetation
between sea and road - distance
of about a mile, old pahoehoe.

1. near sea, from cliff back 100 m
or so. *Fimbristylis cymosa* is very
noticeable but sparse, with
a few other plant, especially
in sheltered spots with some
ash accumulation.
2. inland from this a belt with
extremely sparse vegetation.
3. a wide belt of sparse
vegetation with *Nephrolepis*
prominent in cracks, *Bulbostylis*,
Waltheria, *Cassia* in patches
of ash in depressions, *Heteropogon*,
Vernonia, etc. also in cracks.
4. a somewhat steeper slope,
about 100-200 m wide below
road. This has essentially
the same species as belt 3 but
the vegetation is closed and most
species are more abundant.
Possibly a few additional ones not noticed.

April 24 - Roland, S.W. base
of Bull Run Mts 2 mi. N.W. of
Thoroughfare Gap

in small swampy area
between two streamlets in
deciduous forest

53717 *Vaccinium atrococcum*
① very local

② 18 *Vaccinium atrococcum*
very local, bank of stream

A few wild flowers
in bloom

Dentaria laciniata

~~Thalia~~

Thalictrum thalictroides

Viola sp.

Longiarus canadensis
(almost past flowering)

Lilium canadense

Gindera benzoin

Anisaea atrorubens

shrub 1.5 m tall, branchlets
brownish, corollas greenish
white.

shrub 3 m tall, branchlets
green, corollas cream white.

June 25 — trip to Finland

Left Washington about 6:30 a.m.
missed connection in N.Y.

Left N.Y. at about 12:40 a.m.
arrived London 12:15. Left London
Heathrow at 1:50 p.m. High clouds
and bad visibility.
arrived Helsinki about 5:45.

Helsinki is built on a
substrate of pink granite
variegated with black, outcropping
in low rounded bases here
and there.

Left hotel Vaakuna at 11:20.
Toured Helsinki.

The Vibellius monument,
in Vibellius Park is outstanding.

Drive from Vibellius Park
to follows the
east side of Lake

through a mosaic of mixed
needle-leaf evergreen forest and
broad-leaf deciduous forest
and cultivation on a
rolling expanse of low
granite bases with
depressions filled with
morainal material, this
cultivated or in meadow
with many wild-flowers.
Much of the forest is a
transition between broad
leaf ~~deciduous~~ and needle-

leaf. Regeneration in
openings seems mostly
Betula, *Populus*, *Alnus*, *Talia*,
which are the principal
genera in the broad-leaf
forest. Conifers are
Picea abies, *Pinus sylvestris*.

Saarinen estate

Very pleasing architectural
and landscape complex.
Outdoor sculpture exhibit-
very modern, many pieces
so far out & so artificial as
to be not pleasing, but
some superb examples.

Acer platanoides

Lysimachia spp.

and many smaller ornamental
shrubs and herbs,
in addition to the pines, birches,
spruces, etc.

In surrounding ^{wood, stone} forest &
ground cover of *Vaccinium spp.*

Trip to Jyväskylä through
a continuation of the rolling
worn-down granite ~~at~~
catena of knolls of hard
rock and depressions with
morainal sand and gravel.
Total relief probably not
more than 30 m or so. Same
improved gradient of forest types.

Wild or semi-wild trees:

- Pinus sylvestris*
- Picea abies*
- Betula alba* (s.l.)
- Populus tremula*
- Tilia cordata*
- Alnus*
- Acer pseudoplatanus*
- Acer platanoides*
- Salix*

"Laavijärvi
Luhmasaari

Pine-birch forest with ground cover of *Vaccinium myrtillus*, *V. vitis-idaea*, with *Platanthera bifolia*, *Geranium sylvaticum*, *Veronica chamaedrys*, *Pinus sylvestris*, *Melampyrum*, *Pyrola rotundifolia*, *P. umbellata*, *P. revoluta*, *Lycopodium complanatum*.

June 30 Pyhähakki Natural Park

Mixed dense forest - broad-leaf and needle-leaf trees to 30 m tall - 3 dm dbh, trees 1-3 m apart. Has been no cutting in 300 years, but occasional fires.

- Pinus sylvestris*
- Picea abies*
- Populus tremula*
- Betula pubescens*
- Tilia cordata*
- Alnus*

	dense ground cover,
a	<i>Vaccinium myrtillus</i>
c	<i>V. vitis-idaea</i>
o	<i>Rubus saxatilis</i>
lc	<i>Thelypteris dryopteris</i>
r	<i>Athyrium</i>
c	<i>Maianthemum</i>
l	<i>Calluna vulgaris</i>
r	<i>Fragaria europea</i>
n	<i>Salix</i>
lc	<i>Convallaria majalis</i>
lc	<i>Solidago virgaurea</i>

Large old pines
from before fires. Some dead.

Acc Prof. Mihula the
large *Pinus sylvestris*
(up to 4 dm dbh), some of
them dead, are relicts from
before the 3 forest fires.
After the fires birch, aspen
and perhaps some pine
~~came up~~. The mixed forest
thus established was
gradually invaded by
Picea, which, without
further fires, will gradually
replace the birch and aspen,
~~goading~~ then even the pine,
forming a dominantly
spruce forest. In the
present forest, fairly
well along in this succession

but still definitely
a mixed forest, has
many fallen trees, of
all sizes. These are
covered with moss,
Vaccinium, etc.

July 3 - Left Jyväskylä at 7:30 am.
Weather very clear.

For the first part of the
trip the proportion of forest
in the mosaic is as much as
90%, with cleared areas near
lakes and roads. Toward
Helsinki it decreases to
perhaps 75-85%, still largely
following roads. Lake ~~area~~
scars, forest more unbroken
around them. A large bog -
filled in lake. Proportion of
forest becoming less, but still
more than 50%.

July 4 Left Helsinki at 11:50 am. for
Amsterdam ~~via Copenhagen~~.

Mosaic of forest, grain fields and
lakes, perhaps 50-45-5%, the
knolls wooded, the flat ground
cultivated. Some of the patches
of wood thin, with rocks
showing through, more as slight
progressive, also proportion of
cultivation increases to perhaps 50-60%.
to 60-80%.

June 30 - Pyhähakki Natural Park, near Saarijärvi
in semi-open managed ~~Picea-Pinus~~ forest Pinus-Betula forest with dense ground layer

53719 1 *Linnæa borealis*
locally very common

20 *Lycopodium clavatum*
very local

trailing, scapes erect,
flowers pinkish-white, fragrant.
rhizomes superficial but buried in moss layer,
not very extensive.

July 2 - Jyväskylä,
university campus

21 *Caragana*
planted as an ornamental

shrub 2.5 m tall with
many stems from base.
fruit immature.

July 25 - Sunderland Cascades Franklin Co. Mass.
low beech cliff with
moss and ferns, beside waterfall

22 *Woodia*

July 31 - Roland Center,
s.w. slope Bull Run Mts.,
2 miles n. w. Thoroughfare Gap
Fauquier Co.

② 23 *Galinago*
weed near dwelling,
along garden fence

rays white.

① 24 ^{Aug. 4} ~~Sept. 4~~ Sleepy Hollow, we
Galinago
~~sold~~ in weedy garden patch

rays white

July 4 flight ctd.

12:05 Then proportion of water increased very much.
The land gradually changed into an archipelago of a myriad of small islands. These are mostly, very thinly wooded and rocky. Then tiny ones with scarcely any vegetation.

Then the islands get larger - the largest partly cultivated or grazed, partly rocky and thinly vegetated. Several small towns.

12:15 The archipelago ends abruptly. Another ahead in distance.

12:17 This is rather the Estonian coast similar mosaic to southern Finland. Larger proportion of cultivated land and of water than most of the ~~southern~~ southern Finnish landscape, but proportion of forest increasing southward.

12:40 Visibility becoming very poor.

12:58 A large city.

Land mostly cultivated, sea a short distance to right.

1:07 A large lake, then the sea but no visibility - fog.

1:11 Land glimpsed dimly through the fog.

12:15

1:26

1:29

1:30

series of sand flats and bars, ending in curved section of barrier beach. Then open sea. Crossed Dutch coast - section of barrier beach. Completely cultivated landscape away from coast.

Turned sharp right. Crossed a complicated estuary with sand flats.

~~Crossed S.~~

Most of flight from Amsterdam to N.Y. over clouds with no visibility. However crossing western Greenland ~~sea~~ visibility was reasonably good. The ice-caps seemed very flat, but along western margin a rugged mountain range protrudes through it, with peaks and slopes free from snow and ice. Western side has very little ice or snow, but in the fjords floating ice is abundant, also outside in Davis Strait. Ice blocks are not evenly distributed. Certain patches have them very dense. In sparser areas they seemed to be more or less linearly ~~set~~ arranged east and west.

82

1971 New York

July 23 - about
1.5 miles west of
Sweden Center, just
north of Jackson Pt.

Small hillock about
8-10 m high surrounded
by cultivated fields.

Hill is apparently an
erosional remnant of
bedded limestone containing
abundant fossils.

Collections made and
delivered to Gus Cooper,
U.S.N.M.

Orleans Co.

83

July 25 Leverett Cob Ovens,
head of Rattlesnake Gutter
2 large charcoal ovens
near a beautiful stream
and small waterfall.
Ovens have been in use for
150-200 years, abandoned 9 years ago.
Mixed second growth
with *Quercus rubra*, *Fraxinus*,
Acer nigrum
small weedy meadow.
Alnus thickets along stream.
Stream is Sawmill River.

Rattlesnake Gutter

Gorge with mixed
hemlocks, yellow birch,
Quercus prinus, *Acer rubrum*,
nigrum, white birch,
Betula lenta, *Pinus strobus*,
Quercus rubra, *Tilia americana*, *Fraxinus*
with *Nalnia latifolia*,
Hamamelis, *Acer spicatum*,
Rubus odoratus, *Tilia americana*,
Fraxinus, *Acer pensylvanicum*
Rhododendron cf. *mucronatum*

Good diversity of habitats.

The gorge is about $\frac{3}{4}$ mile
long, opening out below
into a somewhat dissected flat
~~area~~ with white pine
and mixed northern
hardwood. A number of
owners, possibility of preservation.

Sunderland Cascade -
(Mt. Toby quadrangle 7 $\frac{1}{2}$ 4594)

small stream flowing
over flat beds forming
3 waterfalls about 15-20 ft
high. Ledges with abundant
liverworts, ferns -
Asplenium rhizophyllum
on a low breccia cliff, *Woodia*?
40 acres northern hardwood,
nice little marsh. Possible
gift to C.R.W.C.

Projects of Conn.R. Watershed
Council.

Wharton Brook State Park
above New Haven near Wallingford.
White Pine plantation. Very
intensively used.

Aug. 4 - left Dulles 5:45 pm
 Aug. 5 Arr. Paris 7:50 am
 Left Paris 11:00 am
 Arr. Athens 2:45 pm
 Ls. . . . 3:30 pm.

Hills around Athens
 Airport are gray-brown,
 very dry, scrubby
 vegetation sparse on
 slopes, denser on relatively
 level hill-tops and shallow
 ravines.

Golf course very green,
 with open stand of stone
 pines.

A few meters ^{2 km}
 Hills back of Beirut
 are generally wooded or
 heavily bushy, but
 very much built upon.
 Buildings nearly to tops.

88 1971 Indonesia Java

Tjibojung - am. just before
midnight Aug. 11
ornamentals

Pinus merkusii
Spathiphyllum
Cupressus
Acalypha wilkesiana
Rhoea spathacea
Coleus scutellarioides
Zinnia elegans
Cordyline fruticosa red
Plumeria obtusa
Catharanthus roseus
Citrus pentandra?
Lithromia divaricata (spontan.)
Euphorbia pulcherrima
Annona reticulata
Mussaenda philippica cv. *Dona Aurora*
Bougainvillea glabra
Allamanda hendersonii
Allamanda cf. cathartica
Caryota urens
Alternanthera bettzickiana
Cycas circinalis
Filicium sp.
Gardenia jasminoides
Delonix regia

Bali

89

Sangeh -

Grove of *Dipterocarpus* sp.
pure stand, all ~~over~~ sugar
up to about 1 m dbh.

35 m tall

& in closed
shrub layer of
Psychotria, *Casuarina*,
Aglaonema, *Andisia*, etc.
Piper on some tree trunks.
Epiphytes on highest branches.

Perhaps 10 ha temple near center
Highly intricate masonry and
sculpture, covered and made
green by moss, hepatic, ferns,
Pilea, and other plants. Ground
around temple with axonopus
grass.

In forest the litter is dense,
mostly *Dipterocarpus* leaves,
very few herbs except a few
ferns along trails. *Clatostomma*
occasional.

Many very tame monkeys
(macaques?) gray.

Aug. 21 - trip from Canberra

Rolling to hilly country
woodland - open scrub forest
with open acacia spp. shrub layer.

Through Queanbeyan

Then "table-land", rolling
slightly less hilly - very open to
semi-closed rather tall Eucalyptus
little undergrowth.

Cleared about 1880+, some
regrowth. Badly eroded hills,
bedrock

Around Bungendore is
a large basin with internal
drainage, mostly open.
Lowest point is Lake George -
an intermittent lake. Water
enough for water sports in
rainy periods. Dry, ~~supposedly~~
supposedly by evaporation, in
dry periods - then bed grazed by sheep.

Then low-hilly country, closest
to open Eucalyptus forest,
west of Bungendore.

Then another basin, mostly
open.

Rocky scrub with -
Manara Creek now of Braidwood
of Bungendore.
several Eucalyptus spp.
incl. E. paupiflora - snow gum -
parallel veined lvs.

photos of *Panicum infl.*
masses caught in fences.

Then very flat mostly
open country. A few
scattered Eucalyptus, some
Pinus planted along fences.

Warri Bridge, Shoalhaven R.

~~Noorabup~~

granite river bed with
Leptospermum. Ravine walls
with mixed scrub, some
Eucalyptus trees. Lorinandra
(aff. *Xanthorrhoea*) "mat brush"
Acacia sp., *Leptospermum*
Terrace wooded fairly densely.
surrounding country
cleared woodland.

Braidwood

Salix along creeks is all
introduced.

No native deciduous trees.

saw hills bet. Dunes
Dunes & Marlow

Acacia botryocarpa
Pteridium

woodsides in Eucalyptus
forest

Between Charleyong and Venigs
wooded with Eucalyptus but
large cleared areas - woods fairly
thick but not very tall.

Nerriga is in a large rather flat cleared basin surrounded by wooded hills.

Endrick River - in hills covered by Eucalyptus forest. river lined by Casuarina cunninghamia, 10-15 m tall, shrub layer of leptospermum, acacia sp.

Hill with ~~Eucalyptus~~^{nigra} forest with some Casuarina sp. & an irregular shrub layer of Acacia sp. in flower.

Upper part is flat eroded sandstone with scrub forest of Eucalyptus ~~with~~ ^{Cucaciq} + Hakea, Leptospermum sp., Lepidospernum, Boronia ^{umbellata}, Casuarina ^{distylis}, Grevillea bakeri, Dillwynia, Grevillea sp, Leucopogon, Olearia, ~~Lomatia~~, Lomandra longifolia, Lantana, Gleichenia implexa, Styphelia, Platysace lanceolata

W. end of Pigeon House Range

Pyrrosia

Hymenophyllum

Leucopogon cf. lanceolatus

Personaria

Along Pigeon House Range
heath-like veg. with scattered Eucalyptus. Thin soil on sandstone

Tianjana Falls ~~at~~ 1600'
where Tianjana cr. falls over a very high ~~to~~ cliff. Sandstone Heath like vegetation with tall Leptospermum with scattered Eucalyptus along creek banks.

Restio

Lepidospernum?

Leucopogon sp.

Acacia sp.

Hakea

Bet. Tianjana Falls
forming generally closed Eucalyptus forest.

2 mi N of ~~Mt~~ ^{near} ~~Mt~~ ^{of} Megatta Milton
Yackandandah Cr.

Kennedia umbellata Verl.

Comansonia fraseri J. Gay

Goodenia ovata

shrub

Kialoa State Forest

Cochleophy Creek. S. of Termeil
Gleichenia

thick Eucalyptus forest with ^{some} second story of other genera.
Limestone australis occasional.

Away from creek the undergrowth thins out and is sparse.

Just north of Batemans Bay
in this forest

Macrozamia
abundant

Φ *Ferns umbellatae*

Clyde Mt., north slope 2400'

Cyathia

Eucryphia moorei

in moist eucalyptus forest
with thick undergrowth.
tree ferns common

Aug. 21 - Manara Creek,
east of Bungendore, northwest of
Braidwood

53724 in open forest on rocky slope
53725 *Eucalyptus pauciflora*
 occasional
① 26 *Eucalyptus*
 occasional

Aug. 21 Low hills between
Durran Dura and Marlow
(in roadside in Eucalyptus forest)

① 27 *Acacia bolvaocephala*
 occasional
② 28 *Pteridium aquilinum*
 common

Aug. 21 - Warrri Bridge,
Shoalhaven River

② 29 *Leptospermum*
 occasional on irregular
 granite river bed, submerged
 at high water

Aug. 21 - west end of
Pigeon House Range, east
of Endrick River

2000 -
2200 ft
600-670 m

on ~~flat~~ dissected flat
bedded sandstone

① 30 *Platysace lanceolata*
 rare
① 31 (lichen)
 very common on flat surfaces

small tree with very
light smooth bark.
small tree with rather
dense round crown.

shrub, flowers light yellow.
rhizome deeply buried,
about 5 mm thick.

slender shrub 1 m tall.

dwarf shrub 0.5 m tall

(one)

98 1971 Australia

53732 *Camarina distyla*
② common
② 33 *Caustis*
occasional, very local
② 34 *Hakea?*
^{with m.-H. buds} common
③ 35 *Cassytha*
occasional, entangling
other plants
① 36 *Boronia*
^{with buds} very local
① 37 *Grevillea baueri*
occasional
① 38 *Dillwynia*
^{with buds} occasional
① 39 *Stylium*
occasional, local
① 40 (cyp.)
locally common
① 41 *Lomandra flexuosa*
locally common
③ 42 *Gleichenia rupestris*
^{with m.-H. buds} very local in roadsides
ditch
⑤ 43 *Pyrrosia*
on road cut
③ 44 *Leucopogon cf. lanceolatum*
② 45 *Hymenophyllum*
on road cut
① 46 *Personaria*
② 47 *Leucopogon*
locally common on flat surfaces
③ 48 *Oanax*
occasional

New South Wales

99

shrub up to 3 m tall,
erect
erect
shrub, flowers white
purple, brown
dwarf shrub, 3-5 dm tall,
flowers pinkish white.
+ shrub to 1 m tall, flowers
rimson
- dwarf shrub, flowers orange
rosettes rather glaucous.
sterile; very distichous
forming a dense mat
shrub, flowers white
- fruit green, slightly oblique
dwarf shrub 2 dm tall,
flowers pinkish white.
slender erect shrub
about 1 m tall, yellow-green, flowers
white, buds yellow.

Aug. 21 - ~~at~~ above Tiajana Falls, 1600 ft.
 Tiajana Creek, west of Lamprai 490 m
 in irregular scrub
 in open forest on sandstone

(53749) *Restio* erect
 (2) locally common on ~~the~~ sandy stream margin
 (3) 50 *Bauera* weak, tangled.
 very local on sandy stream margin
 (1) 51 *Hakea* shrub; flowers white
 occasional culms terete, erect.
 (2) 52 (sedge) common
 (1) 53 *Epacias Trichilia Ruta d.* flowers white
 occasional
 (1) 55 *Exocarpus* strictly erect shrub
 rare 2.5 m tall; young growth yellowish; sterile.

Aug. 21 - about 2 miles north of Milton, south of Yattayatta
 in roadside scrub in open Eucalyptus forest

(3) 56 *Kennedia rubicunda* Vent. ~~tough~~, twines, flowers dark maroonish red.
 occasional
 (3) 57 *Goodenia ovata* flowers bright yellow
 (1) 58 *Olearia* shrub; rays white, disk yellow.
 (2) 59 *Commersonia fraseri* J. Gray shrub to 2-3 m tall;
 common flowers white.

with wife ~~Aug. 21~~ Aug. 21 Kialon State Forest,
 Cockwhirly Creek, south of Termeil

(1) 60 *Gleichenia* erect

Aug. 21 just north of
Bateman's Bay

5376. ① *Pomax umbellata*
with # added in thin forest

Aug. 21 - upper slopes of
Clyde Mt.

62 ① *Eucryphia moorei*
with R. Hoyle occasional in thick
moist ~~for~~ eucalyptus forest
with tree ferns

Aug. 22 ~~Todd~~ at Tiddbinilla
Nature reserve

63 ① *Cheilanthes tenipolia*
common on open rocky, grassy
slope, formerly cleared for pasture

730m

small tree; leaves very
glossy beneath

small erect tufts

104

1971 Hawaiian Is.

Aug. 31 West side of Kahului Bay
edge of consolidated
dunes 100' wide, with
thin sand cover

In regular patches of
Leucena & *Prosopis* with
open dune rock and sand
between them. *Heteropogon*
around clumps of bushes

In openings

Icaevola coriacea

~~*Heteropogon*~~

Pistostillos grandifolia

Icaevola tenuis

Lippochacta integrifolia
Nama sandwicensis

Imbistylis cyathodes

Walteria undulata

Leucena leucocephala

Aug. 31-32 Kula

There has been an extended
drought - Waikamoi reservoir
is down to about 2 ft of water.
Water rationed to 6 hours a
week.

Mar.

105

Stachys latifolia javanica
Anagallis arvensis
Ficus fallax
Bidens
Cenchrus echinatus
Santana canaria
Tridax procumbens

Many dead *Achatina fulica*,
a very few of a narrow-spined
native shell(?) and on landward
side of dune, in upper edge
of cemetery, many of a
low-spined or medium
sized ~~native~~ species(?), the
last two collected.

1. *Engelmannia rosea*

2. *Eriota similaris*

both det. by Yoshio Kondo
who remarked on how soon
the Engelmanias (introduced
about 10 years ago, to control
Achatina) had become fossil.

Aug. 31 - west side of Kahului Bay,

On slopes of poorly consolidated calcareous sand-dune, with thin loose sand locally.

53764 ⑩ *Nama sandwicensis*
common in crevices and pockets of loose sand in open areas

⑪ 65 *Anagallis arvensis* L.
local in edges of bush patches

⑪ 66 *Passiflora foetida*
rare in edges of bushy patches

⑪ 67 *Sida fallax*
very local in small openings

⑭ 68 *Bidens maniensis*
common in crevices & in open areas

④ 69 *Lipochaeta integrifolia*
very common in open areas

⑭ 70 *Scaevola coriacea*
^{CARYOPHYLLACEAE}
common in open areas

Aug. 31 Haleakala Ranch pasture below Upper Kula Road, Kula, west slope of Haleakala

④ 71 *Abutilon grandifolium*
occasional, edge of Acacia thicket

⑥ 72 *Xanthium*
local colony on flat low place

15-30m.

flowers very pale pink, plant prostrate.

seen in dry condition only, clearly behaves as an annual here, climbing, tracts purplish, fruit purplish when ripe, prostrate, flower faded orange.

main stems prostrate, twisted, scape erect to ascending, flowers yellow.

forming gray mats up to 3-4 dm long; not flowering at this season.

prostrate shrub, rooting at nodes, forming very loose mats; leaves stiff, coriaceous, flat, tending to be held erect; flowers ~~yellow~~ dull yellowish on thick parts outside, thin parts and inside ~~white~~ of corolla white; fruit ~~black~~ fleshy shiny black.

1000m

shrub ~~2~~ m tall, flowers orange
odor rather like a shrubby aromatic herbs, up to 1 m tall, large ones branched.

108

1971 Virginia

Sept. 18 - Roland

(2)

53773 Wolffia

edges of artificial pond, on mud

Two or three submerged and semi-submerged aquatic plants common in shallow parts. Wolffia ~~and~~ most at edge of ~~the~~ pond, at least on leeward side.

Fauquier Co.

109

Oct. 15 - flight to St. Louis,
crossing Blue Ridge somewhat
south of Front Royal (3,000') (12)

Patches of forest on Piedmont
show no significant fall
coloring. Some shows up
on Bull Run Mts., but not much.
A little in Blue Ridge, more
as we go west, esp. on a high
complex in the Shenandoah
Mts. (?), but increasing
irregularly, and not
altogether with elevation,
as the most conspicuous
is an area of moderate
elevation in West Va.

Moderate in w. Ohio.

Haziness or what appears
to be smog, a translucent
haziness, noted in eastern
Ohio, increasing irregularly
till about w. Ohio or Indiana
ground is obscured completely.

Ost. 24 - trip to Boland
Route 66 bet. Beltsville and
Gainesville

Color change near its height -
Nyssa deep scarlet
but leaves largely gone.

Quercus generally still green
except Q. palustris which
is greenish brown

Fraxinus butter yellow
changing to deep purplish or
maroon.

Sinodendron bright light
chrome yellow

Carya greenish yellow
to deep chrome yellow to
somewhat brownish.

Acer rubrum light green
to butter-yellow to somewhat
red.

Cornus florida dull deep
crimson to maroon

Rhus glabra + typina
vermillion to scarlet.
some plants still partly green

Cercis yellowish or
greenish yellow.

Robinia yellowish green.

Taxifolia greenish yellow
through bright yellow, orange
to scarlet.

Oct. 30 - New Orleans

Mississippi River at Audubon Park - belt of *Lesbania* sp. along ~~some~~ levee margin - about 3-4 m tall. At this season leafless, abundant pods. Looks purple from a distance but close up not evident where the color comes from. Pods are brown. Some said to remain on until March.

Oct. 31 Belize Br. Honduras

Much natural or semi-natural vegetation within easy reach of city. Mangroves on way from airport.

About 20 mi⁺ south of Belize a large area of what appears from a distance to be limestone mogotes.

Large cays just south of passage through ~~the~~^{group of} cays ~~in~~ lagoon. scrub forest with tall dead snags and trunks protruding up to twice the height of green vegetation. On one are a couple of large buildings.

North of passage are about 15 small cays. First has

a number of buildings of all sizes. A few cocos about as tall as twice as tall as buildings. There are 4 houses, no shrubs, some grass.

In the others there is only 1 coco, rather tall. Veg. is mostly mangrove or others, in very poor shape, taller trees mostly dead. Several small remnants are only tangled dead mangroves, water between. Only one of the other 11 cays ~~has~~ has a house, the same one with the coco. The entire islets are affected by the hurricane.

No. 1 Robertson Island - scrubby forest much damaged by Hurricane Hattie. Many old bare trunks rising above low scrub or scrub forest. An eagle's nest in one old trunk, one eagle sitting on it. 2 other bald eagles sitting on old snags near the nest.

On a remnant of a mangrove cay north of Simmons Cay 3 brown pelicans on old dead mangrove root crowns.

On cay immediately northwest of Simmons Cay another

eagle's nest on top of a broken-off tree-trunk.

One tall coconut palm on Sunnem's Cay, also an abandoned house, rather skeletonized.

Occasional flying fish.

The cays near Tobacco Pass have much ~~more~~ taller and more luxuriant vegetation with much fewer dead tree-trunks. Clearly less influenced by Hurricane Hattie.

At 4 p.m. entered the southwest pass of Glover's Reef.

Southwest Cay I is covered by tall coconut trees with only one small clump of shrubs in about the middle of the top of the beach on the pass side. Closer up some other bushes can be seen. Many seedling coconuts.

Gothic Cay I has dense undergrowth on northeast peninsula.

vs.
apparently
wrong
info.

from
label
in bottle

Nov. 2 - Long Cay

Fogged with Vapona "dimethyl tulanide" bet. 8:30 and 9:00 a.m. Said to be the most harmless insecticide available. No apparent effect on dragon-flies - *Libellula* that are flying around in some numbers active ingredients

Chlorinated ~~terphenyl~~^{pheno} 40%
Aromatic petroleum derivative
2, 2-Dichlorovinyl dimethyl
acetate ingredient phosphate

contains 60% chlorine.
"Kill Flies Fast"

Fogged yesterday and today, otherwise about once a month.

Shape of peninsula changed by Hurricane Farnellia 1969 Sept 2 years ago. Truncated just beyond 3 coconut trees beyond dining room. Seaward coast north of beach-rock straightened out by this storm.

Irregular rubble flat beyond coconut tree on peninsula built up in last 2 years.

Along lagoon shore a
considerable row of piled
up *Thalassia*, *Syringodium*,
Sargassum

Amphipods and isopods
in it.

bottle (Collected mosquitoes in
tent. Chrysomelid in throat
of *Hymenocallis*. Scarab around
light, also other beetles. Lepisma in tent.

Colonists on new land at
end of peninsula.

Sesuvium portulacastrum
Crocosma erecta
Euphorbia mesembrianthemifolia
Coccoloba uvifera
Tournefortia gnaphalodes

Coconut trees at north-
east end have pinna tips
brown.

Thalassia - *Syringodium*
beds from 0.5 to 2 m depths
perhaps 2/1 *Thalassia* to *Syringodium*
forming a dense deep
sod, the blades very
conspicuously covered
by epiphytic *Melobesia* + *Fosliella*
and other small epiphytes.
Diadema antillarum
very common at 1.- 2 m
depths, a few of a short-
spined large echinoid
and a single large sea-anemone,
all living in the sand
Occasional spots of bar
sand about 3 dm diam.
This is restricted to an area
around pier and southwest of it,
(Monarch butterfly
around *Hymenocallis* fl.)
several seen.

and a spot not far from
peninsula. Most of the
sandy bottom lagoonward
of Long Cay is a pure dense
sod of *Thalassia*.

Plants seen (+ collected)

a *Cocos nucifera* (general ex-
Hymenocallis littoralis ^{invol.})
abundant on back slope of
boulder ridge near beach rods,
planted along paths in
coconut grove.

l c fl. *Corallocarpus erectus* open
l a fl. *Zornia portia argentea* open
l a fl. *Hippobolus virginicus* open
l c fl. *Suriana maritima* open
 c *Lycopersicon planifolium*
 o *Borsigia arboreosens*
 l a *Sesuvium portulacastrum*
 o *Erihalis*
 l c *Euphorbia mesembianthomifolia* open
 l o *Cordia subcordata*
 l *Burmeilia*
 l o *Thrinax*
 l *Fimbristylis cf. cyanoa*
 a *Ageratum*
 n *Melanthera nivea?*
 n *Distachys cephalata?*
 l o *Crocosmia Lucifer*
 n *Euphorbia sp.*
 sterile grass

Nov 2 Small Cay

furiana
 Turnera
 Crinum
 Casuarina
~~Euphorbia megaphylla~~
 Cyperus planifolius
 Ipomoea macrantha
 Sesuvium portulacastrum
 (?) forms?
 Conocarpus erectus
 Euphorbia
 Euphorbia
 Euphorbia
 Bonichia arboreaens

Island is a triangular accumulation of cobble-ry rubble a somewhat rounded coral ~~gravel~~, with the smaller angle somewhat prolonged into a curved rather broad blunt spit. On the north side the gravel is smaller and has much sand. The interior of the larger end is a depression of rocks, with dense Bonichia. Eastern end is being undercut and ~~over~~ falling down.

- 6 Anoles
- 3 Turnstones
- 1 Sandpiper
- 1 Wood pewee
- 3 speckled lizards, sleek-sh. tails,
slender tail

The main vegetation is a closed tall scrub (63' x 4') of furiana, varying locally to Conocarpus. A few young coconuts, and scattered germinating nuts. A single Casuarina seedling, protected by a circle of boulders.
 7 or 8 Crinum plants.
 A belt of low Turnera scrub is in around the margins except where they are undercut.

124 1971 British Honduras

Nov. 2 - small bay (long bay north)
 26. ~~the~~ coral sand and gravel
 53774. *Ephedra virginiana* L.
 (4) very local in interior small
 opening on
 75. *Suriana maritima* L.
 dominant in scrub on
 highest ground
 76. *Paspalum distichum* L.
 one tuft seen on open
 77. *Conocarpus erectus* L.
 dominant locally in scrub on
 78. *Borrichia arborescens* (L.) DC.
 dominant in interior depression on
 79. *Cinnamomum*
 4 plants only seen on sand
 on north side, edge of scrub
 80. *Cyperus planifolius* L.C. Rich.
 in open coral sand in
 opening in scrub.
 81. *Cyperus planifolius* L.C. Rich.
 occasional on periphery
 of vegetation
 82. *Euphorbia blodgettii* Engelm. & Hitch.
 small colony in small
 opening in tall scrub
 83. *Tournefortia gnaphalodes* (L.) R.B.
 abundant around periphery
 of vegetated part of island
 84. *Ipomoea macrorhiza* R. & S.
 very local in scrub

Glover's Reef

125

shrub to 3 m tall, green,
 petals bright yellow.

diffusely branched shrub
 3 m tall.
 shrubs 0.5 - 1 m tall, leaves
 fleshy, glossy green, rays
 yellow.

tufted

tufted

stems arching, flowers
 dull yellowish.

mound-like gray shrub,
 flowers white

twiner, flowers white
 collapsed in midafternoon

53785. *Philosurus vermicularis*
local

- (1) 86. *Euphorbia*
locally common in open flat
on north side of island
- (4) 87. *Euphorbia*
very local on open flat
on north side of island
- (1) 88. *Euphorbia mesembrianthemifolia* L.
abundant around
periphery of island in open
- (3) 89. *Ipomoea pes-caprae* sp. *brasiliense* (L.) v. Ooststr.
very local on gravel spit
- (4) 90. *Sesuvium portulacastrum* L.
very common in open
periphery of

Nov. 3 - Long Cay

in coconut grove with
very little undergrowth

- (1) 91. *Thrinax* ~~sp. flex~~ *floridana* Targ.
occasional near southwest
end of island, several
mature plants (with infls.)
and a number of very
small ones, plus very small
seedlings.
- (1) 92. *Fimbristylis* cf. *cymosa*
common in one area near
southwest end.
- (1) 93. *Diodia cephalata*?? nob. vegetative abnormal
very rare on bare sand

- prostrate, forming low
mats, stem brownish red,
leaves sub-fleshy, all seen
sterile. Stem brittle.
- stems spreading, somewhat
ascending, dull yellowish
green, lactiferous.
- very prostrate
sub-fleshy, gland
appendages white.
- stems strongly ascending,
leaves very distichous.
- prostrate, all seen
sterile
- very fleshy, mat-forming
stems slightly reddish,
flowers light rose pink.

trunks about 6-8 cm diam.,
erect, enlarged at base, up
to 3 m tall, infls. and buds
axillary, panicles ascending
and arching, specimens
from 2 plants, each 1.5 m tall.

tufted, culms ascending,
heads grayish white,
leaves rather fleshy, (to 130)

Nov. 3 - Rain all morning and part of afternoon.

In center of north end of Cay is a great deal of pumice pebbles, one *Entada* seed, and other items that appears to be drift - 150 m from lagoon and 300 m from sea.

Large area of typical atoll phosphate rock north of marshy area. Bright orange-brown white speckled.

A few ^{large} bushes of *Burmelia* just inside boulder ridge at edge of marsh. A few small bushes of *Cordia sebestena*.

Dominant herb layer in most of coconut plantation is *Ageratum* sp. well some *Cyperus planifolius*.

The marsh is filled with coconut leaves. Small coconut trees planted on mounds of sand.

Collected small snails on bottom of pumice cobbles. Also some very small insects.

Large patch of *Hymenocallis* on cobble ridge back of marsh.

Scattered *Coccoloba uvifera* on back slope of beach ridge.

130

1971 British Honduras
(Long Cay ctd.)53794. *Melanthera nivea* (L.) small?(1) 95. *Burnelia retusa* L.
rarea few bushes back of
cobble ridge on seaward side(1) 96. *Mucuna*
on seedling seen(2) 97. *Euphorbia*
occasional

(2) 98. (fungus)

(2) 99. (fungus)

(2) 53 800. (fungus)

all on coconut wood

(2) 01. (fungus)
on Thrinax and coconut wood.

Nov. 5 - Long Cay

(15)

02. *Halodule*small patch in fine
sediments in lagoon just
off hook of north peninsula.in open scrub on north
peninsula(10) 03. *Conocarpus erectus* L.
common(10) 04. *Borrichia arborescens* (L.) DC.
occasional(10) 05. *Sporobolus virginicus* L.
locally abundant in openings
and on ^{dry} beach ridge.(10) 06. *Lithospermum perfoliatum* L.
occasional on broken coral

Glovers Reefs

131

plant 6 dm tall

slightly lactiferous much-
branched shrub 3 m tall,
flowers whitish,
seed podsstrictly erect, slightly
arching at tip.

pileus dome-shaped, tan with brown bands, gills white.

pileus bright red, very wrinkled, gills white,
pileus, gill, and stipe deep tanpileus, ~~stipe~~ ^{tip} and gills pale tanmuch branched spreading
shrub about
1 1/2 m tall

low rounded bush, flowers

yellow.

stems erect from rhizomes

low rounded bush, flowers
white.

Nov. 6 - Flight around and across atoll. 12:40 p.m.

Small amphitheater plan
Reef north of NE cay

First part excellent
spur and groove seaward
margin for a mile or so,

then much less so. No signs
of an algal ridge. After
second curve, good spur and
groove again. Thalassia zone
in shallow portion, clear
sand lagoonward for
about twice width of reef +
Thalassia zone. Some small
sand bars on inner edge
of clear zone locally.

Wide shallow area at north
and after a fairly wide channel
on windward side.

Spurs and grooves extend
a long distance out from
reef flat margin ($\pm 0.5 - 1$ km)
into blue water.

Considerable coral along
with the Thalassia on reef
flat. Clear band in Thalassia
around coral patches very

? photo of cays

Reef very patchy at south
end. Very conspicuous
white band around coral
clumps in Thalassia, on
reef flat and also on deeper Thalassia beds
on lee side.

Water holes on both
middle and SW cay I.

Leeward side has
Thalassia in medium
depth water, many
circular coral patches
in this Thalassia, with clear
bands.

Patch reefs, or lagons have
coral in crescent shape on
windward side sandy
area with less coral
on leeward. Slope abrupt to
deep water.

134

1971 British Honduras

Nov. 6 Northeast cay

plant

Cocos nucifera
Eragrostis dominicensis ✓
Wadellia triloba ✓
Lemmisia
Tournefortia
Cordia leptocephala ✓
Sporocarpus erectus
Ambrosia hispida ✓
Ipomoea pes-caprae ✓
Eriothalis pungens
Borrichia arborescens
Zizaniopsis
Paspalum
Chloris petraea
Euphorbia
Terminalia catappa
Coccocloboia
Musuna (seedling)
Ernodea littoralis
Chrysobalanus icaco
Bursera simaruba
Euphorbia glodgettii
Euphorbia membranacea
Thrinax folia.
Neea choriophylla

F

Nov. 5 - Long Cay

53807

(seedling)

① on beachy of passag at
north end② 08 (fungus)
on coconut log

Glovers Reef

135

Ficus
Paspalum
Acrostichum aureum
Hymenocallis littoralis
Cinnamomum sp.
Sapota
 unident seedling

spores pale gray, gills turning
black

No. 6 - Northeast Cay
in coconut grove.

53808. *Terminalia catappa* L.
occasional in rather open c.

- (4) 10. *Borrichia arborescens* (L.) DC.
small patch in
- (11) 11. *Euphorbia*
several plants
- (12) 12. *Chloris petraea* Sw.
very local
- (13) 13. *Paspalum pectostachyum* Dc.
locally common
- (4) 14. *Eriothallis fruticosa* L.
occasional
- (1) 15. *Fimbristylis* sp. *cymosa*
rare
- (16) 16. *Polyporus*
on rotten coconut log.
- (17) 17. *Coprinus*?
on rotten coconut log
- (18) 18. *Eragrostis dominicensis* (Pers.) Steud.
common locally in low place
- (10) 19. *Parsiflora suberosa* L.
occasional
- (9) 20. *Cyperus planifolius* L. C. Rich.
common
- (10) 21. *Wedelia trilobata* (L.) Hitchc.
common

tree 3 m tall, fruit green,
flowers on low elongate
branches near ground.
— low tangled bush, leaves
fleshy,
— erect shrub 0.8 m tall,
— miller.
tufted, culms almost erect
tangled, fruiting
culms erect.
— shrub 1 m tall, fruits turning
pinkish. (Other plants seen
to 1.7 m tall)

white

light yellow

small tufts, culms
erect, panicles arching
out, flowers cream color with
reddish base to corona segments,
ripe fruit dark blue.
small tufts, culms
somewhat spreading,
prostrate, forming
mats, flowers yellow.

same - on seaward beach ridge

53822. *Euphorbia*
⑤ small colony on rather fine ~~coral~~ coral gravel

① 23. ~~Euphorbia~~ *Euphorbia blodgettii* on tree roots

⑤ 24. *Burmeilia retusa* Sw.
one clump

same, rubble flats along north shore

④ 25. *Sporobolus virginicus*
common in rather sandy spots

④ 26. *Coccarpus erectus*
common, forming thickets

⑩ 27. ~~Erythrina~~ *Erythrina littoralis*
occasional, scattered bushes

① 28. *Euphorbia blodgettii* Engelm. & Hitch.
rare, on ~~coral~~ uprooted coconut stump.

① 29. (seedling)
- top of beach

⑩ 30. *Chrysobalanus icaco* L.
occasional, scattered shrubs

④ 31. *Coccoloba uvifera* L.
occasional ~~sterile~~

same - in Bursera grove in interior of island

④ 32. *Laguncularia*? *Near chlorophyll stand*
small colony

④ 33. ~~Pithecellobium~~ *Pithecellobium campechianum*
single plant

prostrate, pale green.

prostrate, stems reddish.
shrub 3 m tall, rather yellowish green, buds only.

sparsce stand, culms ascending to erect.

shrub 3-4 m tall.

tangled low mound-like shrubs, leaves rather fleshy, flowers purple, fruit orange fleshy
~~sterile~~ prostrate, stems reddish.

low mound-like shrub.
fruit fleshy.
low shrub, sterile

shrub 4 m tall, sterile.

shrub 5 m tall, sterile.

53834. *Bursera simaruba*
④ dominant

33 same - ~~on beach~~
just back of beach
on lagoon north corner.

④ 35. *Sesuvium maritimum* L.
very common, forming mats

④ 36. *Tournefortia gnaphalodes* (L.) R.Br.
very common, forming low ~~sav~~ ^{sav}

④ 37. *Euphorbia mesembrianthemifolia*
very common

① 38. ~~(sp)~~ *Paspalum* ~~pratense~~
locally common on sand

same - on passage
beach ridge of cobbles and boulders

⑩ 39. *Cordia sebestena* L.
common

⑩ 40. *Ambrosia hispida* Pers.
locally abundant
here and in coconut groves.

Nov. 7. Northeast Cay
sand and gravel flats
back of shore.

④ 41. *Hymenocallis littoralis* (Jacq.) Talib.
very local

① 42. *Crinum*
one plant seen (to p. 144)

small tree to 8 m tall,
bark red-brown, peeling,
smooth, sterile.

prostrate, stems green
leaves very fleshy, ~~not~~ glossy,
flowers rose-pink.
low spreading gray
shrub, flowers white.
stems erect, spreading at tops
prostrate, forming a
mat-like sod; ~~mostly~~ sterile.

tree to 7 m tall, flowers
orange-vermillion.
prostrate, forming a
loose mat; racemes erect.

small clumps, scape
compressed, with 2 keels.
about 1 m tall, flowers
white; leaves distichous.
scape about 0.7 m long,
leaves spirally arranged.

Nov 7 - Northeast Cay
 Center of islet has
 a mixed forest of Bursera
 & coconut with > 3832 , thinnest
Coccoloba, partly on flat
 rather fine soil, partly
 on rolling mounds of
 broken coral rubble. Some
 humus accumulation, but
 mixed with coral sand
 and pebbles.

Form phosphate in a pile
 of boulders, but none
 seen in place.

Small water depression
 filled partly with acrostichum.

Mixed scrub on
 boulder ridge

Neck
Bursera
Cordia
Coccoloba
Tournefortia

Nov. 9 - Air trip to Lighthouse
 Reef. Left 9:15 a.m. Weather
 very still, broken clouds.
 sea glassy.

144 1971 British Honduras

53843. *Euphorbia glodgettii* Engelm. ex Hitchc.
⑩ abundant locally on
coarse sharp broken coral rubble

① 44 (seedling)
on coral sand.

~~45~~ *Ficus*
very local

same - in scrub on
back slope of wide
coarse ~~to~~ coral boulder ridge.

⑩ 45. *Ficus ovalis* (Liebm.) Miq.
very local

⑩ 46. *Neem chlorophylla* standl.
locally very common

A same - in *Bursera* grove
in center of island

① 47. *Bursera simaruba* L.
dominant

① 48. ? *Pithecellobium*

same - around water-hole
near center of the island.

④ 49. *Acrostichum aureum* L.
common

Nov. 7 - Long Cay
in 2 m. depth water
just off tip of north
peninsula.

⑩ 50. *Syringodium filiforme* Kütz.
dominant in *Syringodium*-
Thalassia ~~meadow~~ meadow.

glover's Reef

145

prostrate; stems reddish

densely branched
shrub 1.5 m tall.
shrubs 4 m tall, inflorescences
pendulous, ripe fruit
red, fleshy.

flowers whitish.
in

rhizome to 0.4 m tall,
fronds 2 m tall.

rhizomes buried;
leaves sterile; sterile.

F Nov. 7 Northeast Cay

53851 (fungus)
 ② in litter and humus under
coccoloba uvifera

52 (fungus)

52a ^{on rotting log}
 ① ^{St. thiodant} ^{on rotting wood}

F Nov. 9 - Southwest Cay I

53. ^{Wet} mangrove swamp
 ① ^{53.} *Batis maritima* L.
 common in edge of

54. *Avicennia germinans* (L.) L.
 scattered ~~in~~ in open part of

55. *Laguncularia racemosa*
 dominant in landward
 side of swamp

~~56.~~ same - on shingle ridge
 on south side

56. *Cordia subcordata* Rebstorf L.

same on lagoon beach

57. *Borrichia arborescens* (L.) DC.
 one large shrub

58. *Spartina patens* (Ait.) Muell.
 locally dominant back of

to page 154

gills salmon pink, pileous
 deeper salmon pink,
 stipe salmon changing
 downward to yellow
 whole ^{plant} cream-white,
 gills slightly darker.
 soft cartilaginous, burnt orange
 color.

dwarf shrub with
 arching stems, fleshy
 leaves and fruits.
 spreading tree 5-6 m tall,
 surrounded by pneumatophores, leaves whitish beneath,
 sterile.
 small sterile tree,
 4-5 m tall, leaves green
 beneath, surrounded by
 club-shaped pneumatophores.

~~58.~~ dense rounded shrub
 2 m tall; rays yellow,
 leaves fleshy
 dense stand, rhizomes
 deeply buried, sterile.

Nov. 9 Arrived ^{over} Lighthouse
Reef 9:25 am.

Long Cay
Half Moon Cay } Seen from
Northern Cay } a distance.

Sandbar Cay
Saddle Cay only a tiny sandbar, back.

Lagoon has far fewer
patch reefs than at Glover,
but still many. No
really deep water seen
except Blue Hole, a roughly
circular sink lined by a
shallow reef with many
small rocks breaking the
surface.

Made several passes over
Half Moon Cay but could not
land. Vegetation on small
end very sparse coconut gro.
Village of several houses seen.
Dense scrubby forest on
large portion somewhat
chagotic. Many red-footed
boobies in trees and flying.

photos

A few photos of cay and one
of coral patches (second roll.)

On way back, between
lighthouse and gloveris,
a waterspout some way
to right, sea very calm,
a tubular curved funnel
~~the~~ reaching down from
a ~~a~~ cloud, apparently
nimbus, not very dense,
disturbance in water
limited to immediate
area of lower end of funnel.

Nov 9 - Southwest II Cay

Mostly rather thinly planted to coconut.

Most of area sandy.

Patch of Rhizophora on passage side.

Areas of Sporobolus virginicus near beaches.
Large patch of Spartina with some Fimbristylis near lagoon end of pass.

Patches of Capraria, Ageratum, Wedelia here and there. Patches of Passiflora. Rivina dominant over much of interior of coconut grove.
Large patch of Eritalis near south end.
Only 2 small Tournefortia seen. Ipomoea macrantha common locally in grove.
Ipomoea pes-caprae scarce on s.w. end and south part of lagoon beach.

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Plants:

- Coccos nucifera*
- Sporobolus virginicus*
- Paspalum distichum*
- Paspalum*
- Eragrostis dominicensis*
- Spartina*?
- Wedelia trilobata*
- Euphorbia mesembrianthemifolia*
- Euphorbia blodgettii*
- Euphorbia* sp.
- Conocarpus erectus*
- Terminalia catappa*
- Iresine*
- Portulaca oleracea*
- Capraria biflora*
- ~~*Terminalia catappa*~~
- Cenchrus pauciflorus*
- Eritalis fruticosa*
- Hymenocallis*
- Ageratum littoral*
- Rivina humilis*
- Cyperus planifolius*
- Fimbristylis* cf. *cymosa*
- Passiflora suberosa*
- Ipomoea macrantha*
- Ipomoea pes-caprae*
- Rhizophora mangle*
- Coccoclocha uvifera*
- Tournefortia*
- Sesuvium portulacastrum*
- Canavalia rosea*
- Suriuna maritime*

Nov. 9. Southwest Cay I

Mostly planted to coconuts, but two mangrove swamps, one on north side one on passage.

Photo 10 years old shows coconuts planted in west mangrove swamp, and no mangroves except around outer edges.

Euphorbia mesembrianthemifolia
Euphorbia sp.
Spartina
Rhizophora mangle
Avicennia germinans
Cummingia racemosa
Conocarpus erectus
Cocos nucifera
Presine
Portulaca oleracea
Cordia sebestena
Timbostylis cymosa
Cyperus planifolius
Eragrostis dorminguensis
Paspalum distichum
Gnorobolus virginicus
Tournefortia gnaphalodes
Erihalis fruticosa
Capraria biflora
Ageratum littorale
Andropogon virginicus
Batis maritima
Borrichia arborescens
Passiflora suberosa

Southwest Cay I (ctd.)

same - on passage side,
near manay over

53259. *Paspalum distichum*
② locally abundant

same - in sparse coconut
grove near abandoned
dwellings

60. *Andropogon virginicus* glomeratus single erect culm
occasional

same - south side

~~on~~ shingle ridge

61. *Tournefortia gnaphalodes* (L.) R.Br.
occasional

same - near dwellings
in open coconut grove

62. *Chloris petraea*

63. *Eragrostis domingensis* (Pers.) Stev.

64. *Stachystapheta jamaicensis*

65. *Ageratum* ^{litterata} ~~litterata~~ H.B.K.

66. *Cassiflora suberosa* L.

67. *Capraria biflora*

68. *Eriothlis pungicosa* L.

with
R. Schleifer

Nov. 9 Southwest Cay II

68a. *Portulaca oleracea* L.
on sandy ground in coconut
grove

sterile

small bushes, all seen
sterile

flowers pale blue-lavender.

flowers white

flowers white

fleshy, leaves obovate,
flowers yellow, closing
about noon, stamens 12-20,
style branches 3-5; mostly 4

Nov. 9 - Southwest Cay II
open coconut plantation on
sandy soil, northwest end

(5) 53869. *Fimbristylis cymosa* R.Br.
locally common in
(4) ~~70.~~ *Hornis petrea*
occasional in
(1) 71. *Eragrostis domingensis* (Pers.) Steud.
locally common in
(1) 72. *Paspalum pectinatum* Desv. Legum. culms depressed to ascending.
very local
(1) 73. *Paspalum distichum* L.
common near passage
beach
(4) 74. *Sporobolus virginicus*
dominating some areas
near beach.
(2) 75. *Spartina ? patens* (Ait.) Muhl.
dominating considerable
area near beach
(5) 76. *Euphorbia*
very common near
passage beach.
(4) 77. *Capraria biflora*
dominating large patches
(4) 78. *Tessaria portulacastrum* L.
local on and just back
of beaches
(4) 79. *Canavalia rosea* (L.) DC.
occasional in
(4) 80. *Stachytapheta jamaicensis* (L.) Vahl
local, in places common
(1) 81. *Morinda citrifolia* L.
rare, 2 small plants seen

in dense, usually small
clumps, culms erect or ascending,
small tufts, culms ascending
culms ascending, panicle
arching.
culms depressed to ascending.
culms erect, not tufted.

forming a loose sod,
fruiting culms errect from
buried rhizomes.
sterile

prostrate or almost
so, stems green, leaves
pale beneath.
errect, somewhat branched,
flowers white.
prostrate, stems reddish,
forming mats,
leaves very fleshy, flowers
rose pink.
prostrate, creeping.
flowers bright rose pink.
flowers rather light blue
shrub, flowers white.

158

1971 British Honduras

53882

53882 *Terminalia catappa* L.

(1) one tiny, partly dead plant
seen back of beach crest,
plus one seedling.

(1) 83. *Cabrale lanceolata* (Willd.) Schult?

~~seedlings~~ small plants, only in

(1) 84. *Cyperus planifolius* L.C. Rich.
common generally in

(1) 85. *Euphorbia mesembrianthemifolia*
fairly common, mostly
near beaches

(1) 86. *Passiflora suberosa* L.

very common, covering
ground locally in patches.

(1) 87. *Euphorbia blodgettii* Engelm. ex Hitchc.
very local ~~as~~ in

(1) 88. *Tresine diffusa* H.B.K.
common

(1) 89. *Rivina humilis* L.
common, dominant in
~~most~~ of coconut grove.

(1) same - passage beach,

90. *Conocarpus erectus* L.
~~largest tree~~, in edge of water

same - sand flats in
coconut grove, near
south end of cay

(1) 91. *Cenchrus paniciflorus* L.
occasional back of
lagom beach

(1) 92. *Ipmomea perfoliata* sp. *brasiliense* (L.) M. Borth.
occasional back of lagom beach

Glover's Reef

159

sterile.

sterile

small tufts, culms ascending,
erect, spreading toward tip.

wine, flowers ^{yellow} cream color,
corona segments dark at base;
fruits immature.

stems prostrate to ascending
and arching, reddish.

suffrutescent herb.

large tree, fallen but
still alive.

culms rather depressed

53893. *Buriana maritima*
 (4) very local just back of beach

(5) 94. *Coccoloba uvifera* L.
 one small plant just back
 of beach

(6) 95. *Eriothalis fruticosa* L.
 large patch on
 interior flat, a few
 plants on rubble ridge.

(7) 96. *Sporoea macrantha* R. & S.
 very common in large
 patch on interior flat.

(8) 97. ~~Ageratum~~ *Ageratum littorale* Gray
 97. *Ageratum mandarinum* HBK
 abundant in large
 patches

(9) 98. *Emodea littoralis* Sw.
 one plant seen

(10) 99. *Cyperus planifolius* Rich.
 occasional

53900. *Tournefortia gnaphalodes* (L.) Benth.
 (2) two small plants, only, seen.

(11) 01. *Sporoea stolonifera*
 one dense patch not
 far from passage beach

(12) 02. *Chloris petraea*
 very local

(13) 03. *Wedelia trilobata* (L.) Hitchc.
 common in patches
 same in ^{sea} water in passage

(14) 04. *Rhizophora mangle* L.
 small mangrove swamp, this species only

shrubs 2-4 m tall,
 - ~~#~~ fruit immature.

- depressed shrub, 4 dm tall;
 sterile

shrubs 1 m tall, flowers
 white, ripe fruit purple-
 black, glossy.

extensive twiner, flowers
 white, collapsed just
 after noon, accrescent
 sepals fleshy.
 flowers pale-lavender to
 bluish-lavender.

low mound-like bush
 0.5 m tall, of arching branches
 rooting at tips, flowers purplish
 white.

small spreading to ascending
 tufts.

sterile

spreading, mat like,
 rhizomes superficial or
 slightly buried; sterile
 culms ascending

prostrate, creeping,
 forming loose mats; head yellow.

small sterile trees 1 m tall.

same - on rubble ridge
back of passage beach,
S3905. *Hymenocallis littoralis* (Jacq.)¹ S3909 - (7)
② occasional very locally

same - on rotting coconut
logs
③ 06 *Polyponus cinnabarinus*
common

Nov. 12 - West Channel
① 07. *Thalassia testudinum* Koen & Sims
open stand on sandy-rocky
bottom of channel, rhizomes
deeply buried

Nov. 12 - Long Cay
in open scrub on north
peninsula

⑩ 08. *Tournefortia gnaphalodes* (L.)¹
very common
⑨ 09. *Suriana maritima* L.
very common

⑩ 10. *Leskeia portulacastrum*
very common just back
of beach

cub. fleshy, ^{very} ~~paper~~
; flowers white, ^{anthers}
orange.

willian, pilos.
orange and
banded.

ted gray bushes,
late, fragrant.
3 m tall, flowers
very become
pressed to stems
none and at night,
during day unless

strate, forming
leaves very
ossy, green,
rose-pink.

same - on rubble ridge
back of passage beach

53905. *Hymenocallis littoralis* (Jacq.) Salisb.
② occasional very locally

same - on rotting coconut
logs

③ 06. *Polyphorus cinnabarinus*
common

Nov. 12 - West Channel

① 07. *Thalassia testudinum* Koen. & Sims
open stand on sandy, rocky
bottom of channel, rhizomes
deeply buried

Nov. 12 - Long Cay

in open scrub on north
peninsula

⑪ 08. *Tournefortia gnaphalodes* (L.) R.Br.
very common

⑩ 09. *Suriana maritima* L.
very common

⑩ 10. *Lescurvium portulacastrum*
very common just back
of beach

leaves sub-fleshy, ^{for ever}
distichous; flowers white, anthers
and pollen orange.

gills vermillion, pileus
orange or orange and
whitish banded.

sterile

low rounded gray bushes.
flowers white, fragrant.
shrubs 1-1.5 m tall, flowers
yellow, leaves become
closely appressed to stems
during storms and at night,
spreading during day unless
too stormy.

stems prostrate, forming
mats, leaves very
fleshy, glossy, green.
flowers rose-pink.

Nov. 12 boat trip to leeward reef

A cattle egret flew parallel to course several hundred m south, mostly down near waves, but occasionally up to 20-30 m, looked at several patch reefs, first of which had a rock above surface, didn't stop.

Finally at near center of lagoon was a patch reef with a tiny gravel bar. Egret settled here. Flight seemed very direct and purposeful

Woolde Cay - largely planted to coconuts, but with substantial mangrove area with ^(sample) one on ridge. Leeward side of this partially stripped of mangrove and a tough peat layer exposed on inner part of reef flat. Mangroves between shore and pool are buried to a meter or more depth in coarse soil of soil, and looking very poor. (peat sample).

South of this swamp is a thicket of Pithecellobium with a few large trees of Coccoloba, Ternstroemia, etc., no Leseurina and Bursera extremely scarce. Paspalum dominant ground cover in large area of coconut grove west of old house.

Mixed forest of Acacia, Ficus, etc. on Boulders ridge, along with much Tournefortia. Croton very abundant on this cay. In north part practically pure stands forming a tangled low scrub.

Disturbance by human activity on Glover's Reef
Lobster fishing by Honduras boat and divers.

Conch collecting by Lormont.
All cays planted to coconuts except for a few small areas even attempted in mangrove swamps. A few coconut trees even on small cay.
Cobbles and boulders in groves piled up. In Long Cay coconut leaves gathered and put in swamps, sand on boulder ridge. Husks piled in large piles on SW and NE cays. Coconuts removed for sale in Belize some fishing.

Houses built around periphery of Long Cay (about a dozen + dining hall).

Garbage and sewage regularly buried in interior.
Much lumber and miscellaneous trash washed up on beaches
2 dogs, 1 sheep, 1 cat, 3 rabbits
a few chickens & turkeys on island brought as pets or to eat.

Oil film on water of lagoon resulting from gasoline motors in boats.

Land crabs from Glover's Reef
det. H. B. Roberts

Sesarma (Holometopus)
nicordi H. Milne Edwards

Cardiosoma quanhumi Latreille

Ocypode quadrata (Fabricius)

same - in coconut
grove on sandy flat ground

53911. *Ageratum* ~~maritimum~~ H.B.K. littoralis
① very abundant, forming
most of ground cover.

② 17. *Ageratum maritimum* H.B.K.
(same as 53911 but apparently
diseased)

⑩ 13. *Cyperus planifolius* L.
common
same - on seaward boulder
ridge

④ 14. *Cordia sebestena* L.
a few low shrubby plants

⑤ 15. *Hymenocallis littoralis* (Jacq.) Schlecht.
locally very abundant
(also planted along paths)

③ same - at top of lagoon beach
16. *Spartina*? *patens* (Ait.) Thunb.
very sparsely scattered
in stands of *Sporobolus*.

~~Nov. 12~~
~~with Stoddard~~
~~D.R. Johnson~~
Nov. 12 - Middle Cay
in middle of cay
in forest remnants

⑥ 17. *Pithecellobium keyense* Britt. & Cope
abundant

③ 18. *Eriothallis fruticosa* L.
common

⑦ 19. *Thrinax floridana* Sarg.
one tree seen.
~~Thrinax radiata~~ Lodd. & Schult. & Schult. ex Steyermark

flowers pale lavender to
bluish lavender.

small tuft, culms
spreading.

flowers bright orange-red
scape compressed, sharply
angled, flowers white

erect, small tufts.

shrubs to 4 m tall,
all seen sterile.
shrub to 1.5 m tall, flowered with
single stem 3 m tall,
soft panicles drooping.

as same on lagoon beach

23920. *Sesuvium portulacastrum*
very local, seen only at
one place.

24. *Hibiscus tiliaceus*.
rare - small plant seen.

same - on north east
point of cay

25. *Diodia maritima* Thunb.
rare at top of beach, one
plant seen

26. same - on ~~boulders~~ boulder
ridge on seaward side

27. *Eruca sativa* L.
common

28. *Tournefortia gnaphalodes* (L.) Benth.
abundant

29. *Pediasia*
^{are indigo very rare}
same - in coconut plantation
on sand flat

30. *Euphorbia*
very local

Nov. 12 - Long Cay, end of road, houses
26. *Coccoloba uvifera* L.
no small plant on new spit
built since 1964

stems prostrate, forming
mats, leaves very fleshy,
glossy, flowers rose pink
shrub 2 m tall, stems
depressed, flowers
white.

shrub 1 m tall, flowers
white, fruit black
when ripe

low rounded gray bush,
fruit fleshy, taste
green, flowers white,
fragrant.

strictly erect shrub
0.6 m tall,

low sterile shrub about
6-7 m long.

172

173

Dec. 24 - Shutesbury
Fosberg - Blunt property
and open blueberry barren
~~not~~ adjacent. $72^{\circ}26'W$ $42^{\circ}27'N$

The 2 acres owned are
in rather young second-
growth woods of *Pinus*
strobus and associates,
crowded, mostly less
than 15 cm dbh.

Trees:

- a *Pinus strobus*
- c *Pinus rigida*
- o *Tsuga canadensis*
- c *Betula papyrifera*
- lc *Quercus coccinea*
- n *Quercus rubra*
- n *Quercus alba*
- c *Ostrya subcordata*
- c *Betula populifolia*

Shrubs:

- lc *Vaccinium* spp. (low bush)
- lc *Kalmia latifolia*
- lc *Kalmia angustifolia*
- lc *Vaccinium corymbosum*
- n *Gaultheria procumbens*

Herbs:

- lc *Lycopodium obscurum* v. *obscure*
- lc *Coptis groenlandica*
- lc *Epigaea repens*
- o *Mitchella repens*
- lc *Lycopodium clavatum*
- d *Lycopodium complanatum*

Blueberry barren -
apparently an abandoned
pasture, may have been
burned but not very recently

Very low *Vaccinium* is
locally abundant, with
Cladonia, *Lycopodium*
obscurum var. *dendroidea*,
lycopodium tristachyum,
scattered *Juniperus communis* var.
prostrata. *Gaultheria procumbens*

Pinus strobus in area
seems to have predominantly
very appressed needles,
on some trees more or less
spreading. Should be
correlated with annual
vs. biennial leaf-fall. Also
should be checked to see
if needles are appressed or
spreading in summer.

Palms - *Betula populifolia*

- Salix* sp.
- Lycopodium clavatum*
- Solidago*
- Andropogon scoparius*

Other species nearby

- Fagus grandifolia*
- Betula alleghaniensis*
- Pinus strobus*
- Osmunda cinnamomea*
- Viburnum cassinoides?*
- Scyropteris complanata*
- Vaccinium corymbosum*
- Osmunda cinnamomea*

Swampy area which
is the head of a stream
running west begins
on back part of lot immediately
adjacent on south, perhaps
10 m from corner of today's lot.

This swamp is a
hummocky area of
mostly

- Betula alleghaniensis*
- B. populifolia?*
- B. papyrifera?*
- Acer rubrum*

Fagus grandifolia
Pinus strobus
an open shrub layer
up to 8 m tall of *Kalmia*
latifolia with some
Vaccinium corymbosum
Viburnum cassinoides
on ground

- Coptis groenlandica*
- Osmunda* sp.
- Sphagnum*
- Gaultheria procumbens*

178

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